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Vol. 1.



THE

NATURALIST'S COMPANION.

EDITED AND PUBLISHED BY

CHARLES P. GUELFF,

BROCKPORT, N. Y.



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VOL. I.

BROCKPORT, N. Y., JUNE, 1886.

NO. 12.

Egg Collecting.

BY W. G. ROBERTS, SAN LEANDRO, CAL.

Is egg collecting cruel? Many persons say it is, but I think I can prove to the contrary. The housewife knows that a hen is devoid of the faculty of counting, and is generally as content with one egg as a dozen, and will even sit on a china egg. The same case applies to birds, and if one or two eggs are left in the nest, the one already taken will be replaced. Notwithstanding, if sufficient care is not taken, the branches around the nest will be disturbed, and thus the bird will be led to desert it. But this evil is easily remedied, if the collector will be careful and always replace the branches as they were formerly. I assume that none of our readers are cruel enough to rob a bird of all of its eggs; in this case egg collecting, instead of being an interesting and instructive hobby, becomes a cruel and wanton sport. Another thing to be remembered is that an egg should never be taken from a nest without first ascertaining its advancement in incubation; this may be done by holding the egg before the light, and if the yolk is of a dark, sluggish color you may safely take it for granted that a young bird will shortly issue from it,—therefore leave it alone.

There are many articles needed by

the young oologist. First, something will be required for the reception of your eggs. A cabinet may be bought for a fairly low price; but all that is required by the beginner is a nicely planed box, about two inches in depth and divided into partitions by stout strips of pasteboard. Each partition, which is about one inch square, is filled with cotton and an egg placed in each. Eggs are also sometimes gummed on to slips of cardboard which are made to fit in each partition.

Though an egg may be blown with no other apparatus than a pin and the mouth, yet of course a blowpipe and drill are much handier, and the hole made is much neater, and the process much shorter; it will also be safe to remember that without an egg is blown with one smooth hole in the side, it has no market value. A brass blowpipe costs 15 cents, and drills 10 to 50 cents, according to the size; of the latter you will need three different sizes, viz., one of the smallest size drills, a 3-32 inch drill, and a 8-32 inch, for the drilling of large eggs, such as crow's and gull's. To blow eggs, hold the hole that you have previously drilled, downwards, and with your blowpipe blow therein. When the contents have been emptied, inject water in it, so as to cleanse and remove any remnant that may remain. Corrosive sublimate is generally used for cleansing, but as it is excessively poisonous I would

not recommend it. It is often very difficult to blow humming-birds' eggs, the shell being so fragile and susceptible to break. This difficulty may be surmounted by painting the egg with a strong solution of gum arabic and water, which must then be left to dry on the egg; you will be surprised to see how much this strengthens an egg. To brighten eggs, rub a little of the white of the egg on them.

A pair of climbers will be found almost indispensable; they range in price from one to three dollars.

Always have a little note book in which you write name of bird from which each egg in your collection is taken, also size of egg, when and where found, name of collector finding it, also any remarks about nests or peculiarities about eggs. You have thus an interesting account about each egg that is in your collection.

I have noticed a very simple but effective method for measuring eggs. I take it, as it is, from an ancient number of one of our amateur papers.

"Take a small board (four inches square will be sufficient), draw a line across the centre and at even distances from the line place pins or pegs, as shown in the diagram.

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To measure, place your egg length-

wise upon the centre of this and run it along until the ends come in contact with the pins; the figures at the pins which are touched give the width of the egg. Then repeat with the egg sidewise which will give the length."

One more final hint and I will be done. Always keep your cabinet in first-class order, and blowing utensils clean and bright.

To Our Readers.

With this number we have completed the first volume of the NATURALISTS' COMPANION. It has been our aim to make this magazine worthy the support and patronage of every naturalist in this broad land, and it has also been our aim to give our readers their money's worth of good reading and to aid them in their studies of the grand works of Nature. We did not venture the publication of our magazine in the view of a money-making, scheme but with a view to educate ourself and add to our knowledge of natural history. We have succeeded far beyond our expectations, both financially and otherwise, and, by the many flattering compliments bestowed on us by our readers, we feel that they too are highly pleased with the magazine. If one wishes to note the advancement which our magazine has made during the past year, let him lay side by side No. 1 and No. 12. Is there not a vast difference?

During the year just past, many new papers on natural sciences have appeared, and lo! how many have vanished? When we note these occurrences we feel heartily thankful that we have so safely passed through our first voyage on that perilous sea of journalism.

and we cannot help but lament the fate of our less fortunate brethren who sank amid its stormy billows. Now that we have succeeded so famously on our first voyage, we feel amply strong enough to endure the trials and hardships of another journey, and we sincerely hope that all our readers will embark with us again.

Among the many contributors secured for the coming year, we mention the following gentlemen: W. R. Lighton, W. G. Talmadge, Harry F. Thompson, George H. Berry, Warren K. Moorehead, Prof. Edwin A. Barber, Prof. Chas. N. Bell, and W. S. Beekman.

A great many subscriptions expire with this number and we hope that our readers will all see fit to favor us with a prompt renewal. The subscription price will remain the same as heretofore, 35 cents. Wishing our readers unbounded success, especially in their natural history studies, I remain, Yours for science,

CHARLES P. GUELPH.

The Great Mineral Region of Jasper County.

G. D. STORY. CARTERVILLE, MO.

Jasper County produces more zinc and lead than any other county in the United States, besides many other minerals. The iron pyrites found here are the most beautiful in the country. Jasper County is situated in the southwestern part of Missouri, bordering on the Kansas line. Here in Carterville, the centre of the mining region, are enormous mines, also at Webb City, Granby, Carl Junction, Galena, Joplin and many other places. The ore

is found all the way from the surface down, so far not over 250 feet deep, as they are working out the top run; after a while, as it is worked out, they will go deeper. The lead is on top and the zinc is underneath. The way the mines were discovered was by a man plowing the lead up in the grass roots. Some men at work in the mines at this place found a live frog in the solid rock fifty feet deep. There are three large caves in this place, where you can go down into the mines at any place. There are many evidences of the earthquake of 1812 around here. On the river, about two miles from here, there is a ledge of rock about five miles long, part of it on one side of the river and part on the other, and in some places 200 feet high, which is a perfect labyrinth of caves, which are all connected together. The largest one is about fifty feet square at the mouth, and gradually slopes in for about 200 feet, where it gets so small that a man can go no farther, although foxes go in and out of the whole ledge. Last winter some hunters built a fire at the mouth of one of the caves to smoke out a fox, and in about five minutes the animal came out of a round hole about 500 yards back in the woods, where the smoke was rolling out. The country back of the ledge is full of holes which are connected with the caves. About five miles back on the prairie is a large hole about twenty-five feet deep and fifty feet across, with a small hole at the bottom. Hunters very often run foxes in to it, but so far as I know no one has explored it. Some boys and myself are talking of doing so; if we do I will tell you all I can learn about the place.

Sandstone Houses.

BY G. H. SELOVER, LAKE CITY, MINN.

A few days ago I happened to notice, on my way to St. Paul, a number of small holes in the sandstone cliffs, a mile or so east of the city. On returning, I thought I would investigate somewhat, and found that they were not produced by any natural cause, but artificially, as it were, by the various kinds of swallows. Very few of these "cliff houses" were in reach, as these cliffs are from sixty to eighty feet high, and the holes were all within twenty feet of the top. Those in reach from the top proved to contain young of the Cliff, Bank, and Rough-winged Swallows. Very few, on account of the advanced time of year, contained eggs, and these were all nearly hatched. The holes were made in the stone by the birds as nesting places, and were between ten and thirty inches in depth by from one and a half to three inches in diameter.

Will some one who is more conversant with the habits of these species than myself, please let me know whether this is a usual occurrence? As for myself, I have often seen Bank and Rough-winged Swallows burrowing in to the soft clay banks but never before into hard sandstone.

Limestone.

Read at the first annual meeting of Chapter 760 of the Agassiz Association, Jamaica Plain, Mass.

There is scarcely a family of minerals, excepting the quartz, that furnishes so many specimens to the collector or mineralogist as limestone. What collection would be complete without

specimens of Iceland spar, satin spar, calcareous tufa, and stalactites, which when polished are often more beautiful than agates. If all the fossils composed of calcite were to be annihilated, the geologist would lose many of his most interesting specimens. He would lose almost every fossil shell and shell-fish and many fossil plants and leaves.

Limestone is of great interest to others besides those who look upon minerals as something to be collected in vacation to be placed in cabinets, or those who look upon them from a scientific point of view. For the fine arts it is used almost universally, being employed in almost every case for sculpturing and ornamental work. It is of great value as a building stone, some varieties even surpassing granite for durability.

This important family comprises one-seventh of the earth's crust. It includes all minerals that are composed of calcite or carbonate of lime: that is, carbonic acid united with lime. Among the most important varieties of this family are many kinds of marble, Iceland spar, satin spar, chalk, stalactites and stalagmites.

Calcite, which is the scientific name for all limestones, crystallizes in the hexagonal system. The crystals are usually in hexagonal prisms or rhombohedrons. Iceland spar is an example of a rhombohedron. It may be granular as in marble, or it may be compact. The cleavage is rhombohedral. The lustre is vitreous. The streak is white.

The colors are white or light grayish or yellowish, and some of the massive varieties are black. If some calcite be placed in a test tube and a little hydrochloric acid be poured upon it, it will seem to boil, which is caused

by the hydrochloric acid uniting with the lime in the calcite, freeing the carbonic acid, which escapes in bubbles. This is called effervescence. As calcite is the only mineral that effervesces freely with cold dilute hydrochloric acid, it is very easy to distinguish.

Calcite is so slightly dissolved by water that it is tasteless. Fifteen hundred parts of water are required to dissolve one of calcite. Water containing carbonic acid dissolves calcite much more readily. This is noticeable in the formation of caves in limestone, which are formed by the limestone being dissolved by water containing carbonic acid.

If calcite be kept at a red heat for several hours, the carbonic acid is driven out and pure lime is left. The stone will be half as heavy as originally. Limestone that has been treated in this manner is called quicklime. If tested with hydrochloric acid in the same manner as the calcite was, it will not effervesce. This is because there is no carbonic acid in the mineral to escape.

The commonest method of burning lime in a lime kiln, is to build a furnace, either round or square, with an opening at the base to manage the fire. At first large pieces of limestone are piled in the form of an arch, leaving a place for the fires, and then the stone is thrown in loosely over this arch. After the heat has driven out the carbonic acid, the fires are put out and the quick lime is taken out.

If water be added to the quick lime, it will swell, burst into a powder, and grow hot, and although water has been added it is still quite dry. The water has united with the lime, forming slaked lime. If quick lime is exposed to

the air, it takes up moisture and becomes air-slaked. If the quick lime is slaked with enough water it forms white-wash, which is very useful. On standing, part of the lime will settle, leaving pure lime water, which is a saturated solution of lime; that is, the water contains all the lime it can dissolve. One hundred parts of water will dissolve one of pure lime; and as fifteen hundred parts of water are required to dissolve one of calcite, pure lime is much more soluble. If a person blows into some lime water through a straw, the water will become cloudy, then milky, and finally some fine white powder will sink to the bottom of the glass. This is caused by the carbonic acid in the person's breath uniting with the lime in the water, forming carbonate of lime or calcite, which is not so easily dissolved as pure lime, therefore the water cannot contain as much calcite as pure lime, and the calcite is deposited as a fine powder.

TO BE CONTINUED.

In 3,000,000 years the mean annual temperature of the earth will have decreased thirty degrees, and eventually the terrestrial hemisphere will be frozen up, according to the latest astronomical computations. It makes one shiver to think of it.

—o—

High winds are sometimes a surprise to birds as well as to men and beasts. A long-legged sand hill crane was taking a nap by the side of a pond in the zoological garden in Philadelphia, when a mighty gust of wind struck him squarely and knocked him into the water. He came up dripping and when the crowd laughed he sneaked away to a lonely corner.

Giants Among Small Things.

BY CHAS. D. PENDELL, WAVERLY, N. Y.

Were we to write of the geological predecessors of the existing species, volumes would be required to produce anything like an adequate description. Two examples from the past, however, will be better than none and may induce the reader to delve more deeply into the mysteries of that fascinating science, Geology.

The lobster of the present era, as commonly seen, does not exceed five pounds in weight and is oftener less; though when arrived at full maturity their weight is about ten pounds. But going back countless ages to the early Devonian era, we behold what may truly be termed a prince of lobsters. This giant crustacean, which is called *Pterygotus*, attained the length of six feet and was two feet in breadth. Its antennæ were armed with powerful claws, and in many ways did it possess double advantage over its modern congener. It possessed two pair of eyes—a large pair on the front of its head and a smaller pair on the top. For perfect mastication it was provided with four pair of great serrated jaws. (Surely, it never became extinct through dispepsia!) On each side was a powerful paddle, enabling it to swiftly pursue its prey; while if attacked by any predaceous superior, it could, by striking the water with its broad tail, retreat with the rapidity of an arrow.

The Triassic period furnishes another example in a species of frog, which sometimes attained a size fully equal to an ox. No complete remains of the *Labyrinthodon*, as it is called, have

been found; but enough to fully establish its character. The mouth was furnished with numerous rows of small but closely set teeth, and from this fact it derives its name.

Conchology is not supposed to be replete with gigantic specimens, but in the archipelago of the Molucca Islands, such specimens are by no means rare. Here the *Tridacna*, sometimes weighing five hundred pounds, fasten themselves to the rocks and can only be cut loose with an axe. Their thick shells, five feet long, are used by the natives as bath tubs, ready cut and polished by nature.

Another mollusc of prodigious size is the cuttle-fish. One seen near the Canary Islands had a spread of arms of twenty feet and weighed over four thousand pounds.

A variety of sponge known as Neptune's Cup, grows on the submarine rocks, from three to six feet high. Their small stock and wide top, symmetrically hollowed out, is an almost exact representation of a colossal drinking goblet.

The marvelous delicacy of organization and still more marvelous intelligence of insects has always been a cause of wonder and a source of admiration; and in this class also, we find extremes of strength and size. One species, the *Goliath* of Drury, is much larger than many kinds of our more common birds, which it would pitilessly strangle and devour, were it in his power to capture them. This entomological monster is, from the extremity of the abdomen to that of the mandible, four inches long and is one half as broad, and armed with its strong bony coat of mail, it well deserves its name. The *Mormolyce*, though meas-

uring three and one-fourth inches in length, is not a powerful insect and its source of protection lies in the resemblance of its green wings to the leaf of the plants among which it lives. The antennæ are nearly three inches long, making its extreme length about six inches.

A species of butterfly exists in South America, the body of which is as large as that of a robin and its velvet wings, ornamented with the most gaudy coloring, extend a foot across.

Many spiders of the tropical world have a body three inches long and the circle of their legs six inches in diameter; and one species on the Amazon is five inches long. Some of these giant spiders are extremely active and will attack small birds and strangle them in their nests. One species quite numerous in Columbia, some times fastens on the neck of chickens and pigeons, seizing them by the throat and killing them instantly. Others of these spiders obtain their prey by weaving webs so strong that large butterflies and small birds, even, become helpless victims. Though in the temperate zone spiders are of repulsive appearance, numbers of those of the tropical world are radiant with the shine and metallic lustre of many and varied colors.

In the botanical world the leaves and flowers of plants generally attract us by their symmetry and regularity of outline, or the beauty and harmony of their color and their delicate but pleasant perfume. But if we transport ourselves again to the Amazon we find there the leaves of the *Victoria regia*, which display themselves on the surface like immense plains of verdure. These leaves are nearly circular and from eighteen to twenty-five

feet in circumference. The upper surface is of a uniform and beautiful green; thus, when seen from a distance, presenting the appearance of floating tables covered with velvet. The framework of these leaves is so strong that a child can float on them; and they are nightly used as a cool resting place by the many aquatic birds of that region.

The leaf of the great taliput palm which grows in India is so large that under its vast cover forty persons can shelter themselves. The leaf of this tree is sometimes fixed to the ceiling of museums of natural history, one leaf covering it completely.

The flower of the remarkable *Victoria regia*, the leaf of which has been referred to, was long considered the largest in the world. These brilliant rose and white blossoms often measure a yard in circuit and emanate a pleasant fragrance.

But the flower of the gigantic *Rafflesia Arnoldi* is a perfect monster of vegetation and leaves all others far behind. On account of its mammoth proportions, botanists for a long time refused to believe the existence of such a flower, and it was not until a specimen was sent to London and there examined that all doubts were dissipated. The flower is composed of a fleshy mass weighing from twelve to fifteen pounds. "Its border, the circuit of which is not less than ten feet, shows five lobes, forming a gaping excavation capable of holding a dozen pints." Its odor is unpleasant having a carion-like smell. In Sumatra and Java where it is found, the natives almost make a divinity of it and clothe it with a supernatural power.

But while the ignorant savage of the mighty works of nature creates a divinity, the naturalist recognizes in them the manifestation of an omnipotent Creator, whose works and wonders are everywhere displayed to the observing mind.

How to Make a Skin.

During the short collecting season, it is not always practicable to stuff and mount birds, especially when on a collecting trip, as one generally wishes to spend as much time as possible to capturing specimens. We therefore give the following directions by which one can preserve the skins, and in the winter, when time is not so precious, they can readily be mounted. After skinning the bird, as directed on page 44, No. 3 of the COMPANION, the skin is arranged in its natural position. Draw the leg bones out till exposed, wind with cotton and draw them back into their proper position. Fill the skull and cavities of the eyes with cotton; draw out the wing bones and fasten them about an inch or two apart (or as near together as they were in the original bird); this makes the wings fall into their natural position when the bird is stuffed. Now take a thin layer of cotton and place it along the back of the bird (inside the skin) and under the string by which the wing bones are fastened. This done, take a piece of cotton and rub it between the hands until it tapers to a point at one end. Take the tapered end of the cotton and pass it up the throat of the bird and out of its beak; draw it up until the throat of the bird is filled out to its natural size. Now fill the body with more cotton, if necessary, and carefully sew up the opening. Take the bird by the beak and shake it slightly so as to loosen all plaster, etc., and to make the feathers fall into their natural position. Next draw the feet down their full length and tie them together. Cut off the cotton where it protrudes from the

beak and run a needle full of thread through the nostrils and tie it under the bill, thus holding it firmly together. Now draw the bird out to its natural length, place the wings, feet and head in position and arrange the feathers properly. Get a sheet of stiff paper (writing paper will answer) about four inches longer than the bird. Take the paper and roll it into a cylinder, fasten with two pins. The diameter of the cylinder should be the same as that of the bird before skinning. The filled skin will be larger. Drop the bird into the cylinder two or three times to shape it, and then put it in until the beak protrudes from the opening, arrange it with the forceps, and see that the wings are even and the feet in proper position. Leave it for twenty-four hours, then remove it and arrange any feathers that may have been misplaced and replace it in the cylinder and leave it until dry. When dry the head and neck will be perfectly stiff. In the next issue we will give directions for relaxing and mounting these skins.

Rev. W. M. Beauchany, Baldwinsville, N. Y., has our sincere thanks for a copy of his excellent work on the land and fresh water shells of Onondaga County, N. Y., with a supplementary list of New York species. Price, 10c.

The coast of Alaska possesses a remarkable ichthyological curiosity in a candle fish. It is about eight inches long, transparent and very pure white fat. The Indians dry this fish, and then light it at the tail. It burns with a clear sparkling flame which a wind cannot extinguish. The fish will burn for a number of hours.

THE NATURALIST'S
COMPANION.



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branches of Natural History.

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We request all of our readers to send us a description of their collecting excursions, their finds, or any items they may think will be of interest to the readers of the COMPANION.

CHARLES P. GUELFS,

EDITOR AND PUBLISHER,

Brockport, New York, U. S. A.

ASSOCIATE EDITOR,

H. F. Thompson, Indianapolis, Ind.

RANDOM NOTES.

Hot! hotter!! hottest!!!

On account of issuing so large an edition, this number is rather late.

Thompson & Co., of San Francisco, Cal., have our thanks for a number of Chinese curiosities, including chopsticks and coins. See advertisements.

We have just issued a price-list of Indian and war relics and curiosities for Mr. T. B. Stewart, Island, Penn. The prices are very low.

Our friend, Mr. W. G. Talmadge, Bristol, Conn., has gone into the electricity business, in which he is evidently having good success.

Persons in want of first-class Job Printing at rock-bottom prices should send 1c. stamp for our reduced price-list, just out. Twenty per cent. cheaper than other printers.

We send out a large number of sample copies this month, and should you receive more than one, you will confer a favor on the publisher by handing the extras to your scientific friends.

Prof. Chas. N. Bell, of Manitoba, Canada, recently read a length paper on "Prehistoric Remains," before the Royal Society of Canada. Prof. Bell has favored the COMPANION with a contribution on the archaeology of Manitoba, for which he has our sincere thanks.

We are receiving most hearty encouragement from archaeologists, and we trust our readers will appreciate the archaeological articles with which we are presenting them. Editors will please bear in mind that all such articles are written especially for the COMPANION, and should not be copied without our consent, and credit given also.

By the time this number reaches you we will be encamped on the shores of old Ontario, enjoying a hard-earned vacation. On our return, we will write up an account of our adventures while in camp, which, we believe, will greatly please our readers. All communications intended for us only should be addressed "personal," and they will be forwarded. All subscriptions and communications should be addressed as heretofore (address above) where they will await our return.

J. Allen, Jr., Lake View, Ills., has our thanks for a file of his excellent magazine, *Young Naturalist's Journal*.

Read every advertisement in this issue and you will secure some magnificent bargains.

Our readers will please excuse us for devoting so much space to advertisements, it will not occur again.

We can now supply our readers with all the back numbers of this paper, excepting No. 1, at five cents each.

We will print your name, address and business on 100 good envelopes and send post-paid for 40 cents silver.

The finest natural history journal yet received is the *Ornithologist and Oologist*, Frank B. Webster, publisher, Boston. Price \$1.50.

Parties in want of first-class bird skins we would recommend them to Fred C. Lusk, a thriving taxidermist of Holley, N. Y. See advertisement.

We will send 100 sheets of unruled writing paper (blocked) post-paid for 25 cents. Just the thing for business men and collectors to make notes on.

We have just received a fine lot of bird skins of R. E. Rachford, Grigsby's Bluff, Texas, to whom we would recommend our taxidermy friends.

J. E. Jones, St. Johnsbury, Vt., will soon start on his regular collecting trip to the sea shore, and is prepared to fill orders for gull's eggs, sea weeds, mosses, shells, sword fish swords, and general curiosities.

The *NATURALIST's COMPANION* and the *Collectors' Science Monthly*, a large magazine devoted to philately, numismatics and general natural history, both one year for 60 cents. The price of the *Monthly* alone is 75 cents.

The Naturalist's World, Percy Lund & Co., publishers, Ilkley, England, is by far the neatest and most interesting of any natural history journal received from a foreign country.

For only \$1.00 we will send Davie's famous Egg Check List and Key to N. A. Birds, describing the nests, eggs and breeding habits of every North American bird, and one year's subscription to the *COMPANION*. The regular price of the book alone is \$1.00.

In looking over a number of natural history papers recently, the prices ranging from 50 cents to a dollar, we find that our magazine contains more reading matter than any other American natural history journal priced less than one dollar.

The stingray is the natural enemy of San Francisco oysters, and his appearance on the Atlantic coast is almost as much to be dreaded as the five-fingered starfish that destroys the beds of eastern waters. The fish has a powerful pair of jaws, with which he considers it no trick whatever to smash the shell of an oyster into powder, after which he sucks the meat into his stomach and discards the rocky debris.

NEW SHARON, Ia., June 14th, '86.

Dear Editor:—

I have perused the contents of No. 11, Vol. 1, carefully and have no hesitancy in saying I think you are at the front giving us the most information for the money of any paper I have taken or seen. My subscription runs out with the August number, I believe, but you can count on me for another term, sure. I am, as ever, one of the *COMPANION* family. R. D. GOSS.

We could print hundreds of testimonials like the above, had we space.

CORRESPONDENCE.

On May 26th, I took a set of four eggs of the Scissor-tailed Flycatcher, from a nest placed about six feet from the ground, and on June 10th I took another set of eggs from the same bird out of the same nest.

G. F. STEARNS, Circleville, Texas.

You asked in your paper for brief notes on birds. I have noticed the following birds, rare to Kansas, this spring: Am. Herring Gull, Black Tern, Willett and Scissor-tailed Flycatcher, also had given to me a very fine specimen of Osprey and Wilson's Phalaiope, both shot in Kansas. I have had very good success collecting eggs this spring. F. M. WOODRUFF,

Topeka, Kansas.

Is not a nest of 37 eggs of the California Quail a large one? I collected a set of that size yesterday. I had seen several Quail in the field lately, and concluded to take a look for nests. After searching unsuccessfully along the fence, I started for the house, and when within fifty yards of it, I almost stepped upon two of the birds, and upon looking in a small wild rose bush I discovered the nest above mentioned. I, as well as others in this vicinity, are of the opinion that several Quail lay in the same nest. G. N. BEARD,

Upper Lake, Cal.

Davie quotes the number of eggs as from eight to twenty-four. As to more than one bird laying in the same nest, we think it rather doubtful. Would it not be a good plan for you to investigate the matter?—[ED.]

The following arrivals are among those noted:

Robin, February 23d.

Bluebird, February 24th.

Blackbird, March 2d.

Bobolink was noticed on May 17th and on the 23d, but probably arrived before that date; it is a rather uncommon species here.

The Great Blue and White Herons and the Brown Pelican and Sand-hill Crane are common. A Golden Eagle was shot upon the open prairie near Ottumwa in July, 1883. I do not believe mention was made of the fact at the time other than locally.

W. R. LIGHTON, Creston, Iowa.

Bird arrivals since last list:

Yellow-bellied Woodpecker, Ruby-crowned Kinglet, House Wren, April 9.

Winter Wren, Jack Snipe, Pectoral Sandpiper, Chewink, April 10.

White-throated Sparrows, April 15.

Wood Thrush, Yellow-rumped Warbler, Chipping Sparrow, Brown Thrush, April 16.

Bartram's Sandpiper, Am. Bittern, Carolina Rail, Virginia Rail, Sparrow Hawk, Swamp Song Sparrow, April 17.

Purple Martin, King Rail, April 18.

Red-headed Woodpecker, Savannah Sparrow, April 23.

Field Sparrow, April 24.

Black and White Creeper, Pine-creeping Warbler, April 26.

Ruby-throated Hummingbird, April 28

Barn Swallow, April 29.

G. B. HOLMES, Fernwood, Ills.

It may be of interest to you and to the readers of the COMPANION to know that on June 2nd we obtained seven Roseate Spoonbill's eggs from one nest. This we believe to be the largest set of this bird's eggs ever obtained before.

R. E. RACHFORD & SON,

Grigsby's Bluff, Texas.

Flint Implements.

BY W. K. MOOREHEAD, GRANVILLE, O.

There are picked up nearly every day, by collectors all over the United States, hundreds of implements of various shapes, sizes and colors, and of different grades of workmanship, all of which are chipped from that well known material—flint. The material out of which these implements are made was probably quarried at Flint Ridge and carried from there to the home of the savage. This place was a favorite resort for the Ohio Indians, as numerous and deep excavations in the hill-side will testify. The Indians living at a great distance probably secured flint enough for all purposes in creek beds or along some mountain side.

In all cases after the flint was secured it was made into rough blocks resembling a large spear head. This reduced the size and made it easy to be transported to their homes. When once there, they could fashion it as they chose. (This statement I make in regard to their reducing the rough flint to blocks, I can prove by the following:—At the famous locality of Flint Ridge, Licking Co., Ohio, not far from the “pitts” are found spots about two hundred feet in diameter where the ground is literally covered with flint chips. There are also numbers of the flint blocks found on these spots. The chips prove that the blocks were reduced in size there.)

When once home the Indian gave his blocks to “the village arrow-head maker” who fashioned such implements as were desired. On the site of Indian villages in this State the spot where the arrow-head maker's hut

stood can easily be found by the numerous chips, broken and unfinished implements which lie about on the ground.

Now that the flint is dug, transported and made into implements, let us classify these.

To the average collector there are ten general classes of flints. (Under each of these there are many subdivisions which space will not permit me to give.)

These ten are:—Arrow-heads, Spear heads, Knives, Scrapers, Drills, Lance heads, Gun flints, Discs, Celts, and Spades.

Arrow-heads are the most numerous kind. They present such a variety of forms that a classification is difficult. They may be divided into the following classes:—Triangular, leaf-shaped, barbed in top, rotary, barbed in side, and barbed at base.

These various forms of arrow-heads lead us to think that the smaller and sharper ones were used for small game. Some were used especially to shoot fish. Some collectors have even gone so far as to say that the triangular flint was used in war alone. That is a very good theory, but it does not stand the test as a fact. If an Indian was out hunting, with a quiver full of arrows, some pointed with triangular flints, others with barbed flints, and was to see an enemy, would he not shoot his barbed as soon as his unbarbed points?

The great Fort Ancient gives evidence of many a battle fought within its walls, and there are just as many barbed as unbarbed flints found there. We cannot, therefore, classify arrow points according to use.

Spear heads are readily distinguish-

ed from arrow-heads by their size. All points over two and one-fourth inches long (unless very light) are admitted to be spear heads. Spear heads often reach seven or eight inches in length, but ones longer are quite rare. Lance heads and spear heads are often confused; indeed it is very hard in some cases to tell one from the other. But the following rule will greatly help one: "Lance heads are usually leaf shaped, thin and delicately chipped and quite sharp."

Flint knives occur less frequently than the implements just mentioned. Knives, as a rule, are better made. They vary in length from one and a half to six inches. Some of them have the point chipped to a beautiful curve and are quite sharp. Others are high in the centre and slope to the sides. Most of them were made to use without a handle. Flint scrapers are rare in some localities. In central Ohio they occur in large numbers. It is supposed that these scrapers were once good arrowheads, but becoming broken, were chipped down to a broad edge, lashed to a stick and used to scrape hides, scale fishes, etc.

Drills are the most beautiful and symmetrical of all the flint implements. The material out of which they are made has to be of the best. The average length of drills is three inches. Some few have been found nearly five. the perforations in the slate ornaments were probably made with these drills.

Gun flints are often found. They can hardly be classed as implements, and a word will be sufficient to explain them. They were used by the Indians on the old flint lock muskets.

Discs, celts and spades are of similar forms, and hence, are very hard to

classify correctly. Round flat pieces of flint roughly chipped are found on the surface and occasionally in mounds. For want of a better term they have been called discs. Celts made of flint with well worked edges occur in certain localities. They bear a great resemblance to spades. Spades are large, spear-head-shaped blocks of flint. They are found in numbers in Missouri and Illinois. It is supposed that they were employed in throwing up the mounds and in loosening the earth so it could be readily scraped into baskets and carried to the embankments.

EXCHANGES.

THIS column is open to all subscribers, who may insert exchanges free of charge. NO advertisements admitted to this column under any circumstances, and we shall reserve the right to insert no exchanges which are merely intended to secure cash purchasers.—Ed.

F. C. LUSK, Holley, N. Y.—To exchange, first-class bird skins or eggs for works on birds; Gentry's preferred.

GLENN STEARNS, Circleville, Texas.—Would like to exchange minerals and birds' eggs for same. Send lists.

G. E. WELLS, Ames, N. Y., U. S. A.—Fine minerals, Indian relics, curiosities, rare coins, native woods, to exchange with foreign collectors.

A. B. ROBERTS, Weymouth, Ohio.—First-class eggs of White-rumped Shrike, Mourning Dove, Brown Thrasher, Purple Grackle, Eng. Sparrow, Grass Finch, Pewee, Cowbird, Catbird, Kingbird, and Robin for Indian relics or good curiosities. One fine fossil clam for every perfect arrow-head. Starfish, sea urchin, shark's egg, Chinese coin or 10 numbers Young Oologhast for best offers of arrow-heads.

ALDEN LORING, Owego, N. Y.—Four perfect Indian arrow-heads for the first four numbers of this paper and the first three numbers of the *Sunny South Oologist*.

Harry Fox, Murdocksville, Pa.—An arrow-head, a red-headed woodpecker's or yellow-billed cuckoo's egg for the first number of the *NATURALISTS' COMPANION*. Fossil crinoids and stems for U. S. coppers earlier than 1845.

J. W. JACOBS, Waynesburg, Pa.—A collecting case (used for an egg collection; cost \$5; nearly new; size inside 4x10x30 inches; send for drawing) and a collecting box, size 4x8, for the best offer of birds' eggs. Will also exchange birds' eggs for same.

EUGENE W. GRAFFORD, Danbury, Ia.—I will exchange the following birds' eggs for others: Turtle Dove, Pewee, Kingbird, Robin, Thrush, Bank Swallow, House Martin, Prairie Hen, Blue Jay, and Yellow-shafted Flicker. I would like three specimens of each.

F. N. MASSOTH, JR., Hanover Centre, Ind.—Type writer, printing press and outfit, watch, books, papers, minerals, birds' eggs, Indian relics, coins, microscope, stamps, shells, and many other articles for a bicycle, rotary printing press, stamps, fossils of any kind or any, thing else.

G. D. STORY, Carterville, Mo.—Minerals, woods, fossils and curiosities to exchange for minerals, fossils, petrifications, coins, fractional currency, Indian relics, ocean curiosities, match, medicine, playing card and revenue stamps and curiosities of all kinds. Books of all kinds nicely bound and in good condition, papers and magazines for books on geology, minerals, archaeology and natural history. Lists.

W. A. ACKERMANN, Marengo, Iowa.—Stamps of all kinds to exchange for *Golden Days*, coin sale catalogues, stamp, coin, and curiosity papers.

W. W. PHILLIPS, Clark P. O., Pa.—I will give a packet of 10 varieties of S. A. and African stamps for two perfect arrow-heads or two good minerals not less than $1\frac{1}{2} \times 2\frac{1}{2}$ in. not in my collection; also Longfellow's poems bound in cloth, for best offer in minerals, birds' eggs, Indian relics or any natural history specimens.

R. D. GOSS, New Sharon, Iowa.—To any one sending me \$2.50 worth (dealers catalogue prices) of first-class eggs with data (or \$2.00 worth, my selection) I will send recipe with full instructions for embalming birds and mounting them by the process which keeps them from moths, mice and sweet for ages. Have used it with best of success for past five years. Many exchanges last season; no complaints but many testimonials of its merits. Reference, J. A. Singley, Giddings, Texas, and Julins Schneider, Anaheim, Cal. Will also exchange for same value in Indian relics, fossils and minerals.

QUERIES AND ANSWERS.

W. W. P., Clark, Pa.—The bird described is the Cedar Waxwing.

G. S. W., Jersey City, N. J.—Your article is not the proper thing for a natural history journal; would answer better for a story paper.

N. F. M., New Salem, N. C.—The specimen sent is not a definite mineral specie, but a lithological specimen. It is a cleavable dentritic silica schist. Rather pretty but not worth much.

B. L., Leslie, Mich.—The egg sent for identification is the Field Sparrow's while the mineral is evidently limestone

G. S., Circleville, Texas.—The bird of which you sent feathers and egg is the Bronzed Grackle, the other bird and egg described is the Caracara Eagle. We cannot name the two white eggs sent unless you describe the nest, etc., and if possible the bird.

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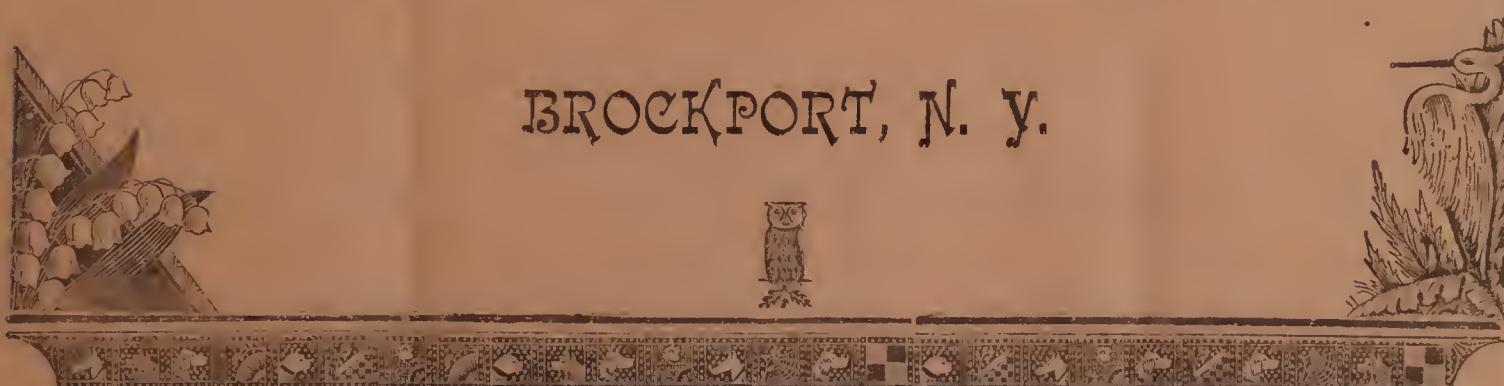
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CHARLES P. GUELPH,
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VOL. II.

BROCKPORT, N. Y., AUGUST, 1886.

NO. 1.

The Shell.

Like a dawn in the midnight
Rose from their sea-weed chamber the choir
of the mystical sea-maids,
Onward they came in their joy, and around
them the lamps of the sea-nymphs,
Crimson and azure and emerald, were bro-
ken in star-showers lightning
Far through the wine dark depths of the
crystal, the gardens of Nereus,
Coral, and sea fan, and tangle, the blooms,
and the plains of the ocean.

—Kingsley.

Burial Mounds of Manitoba, Canada.

BY PROF. CHAS. N. BELL, KINGSTON, ONT.

 EARCH has recently been made
for the remains of the Mound-
Builders in the Province of Manitoba,
Canada. This Province is situated di-
rectly north of Minnesota and Dakota.
Investigation has revealed the presence
of several groups of burial mounds on
the banks of the Red, Assiniboine,
Pembina, and Souris rivers. Several of
these mounds have been opened, and
the articles found in them include hu-
man and animal bones, stone scrapers,
tubes, pipes and mauls, bone needles and
fish spears, copper chisels, awls and or-
naments, gorgets, beads, and other or-
naments cut from marine shells, pottery,
etc., which are identical in character
with those catalogued in the National
Museum of the United States. as recov-

ered from the mounds of the Mississippi
and Ohio valleys. The structure of the
mounds already opened is the same as
the ordinary burial description, though
in one case there appeared to be an altar.
There is a line of mounds from St. Paul,
Minnesota, on the Mississippi River, up
the Minnesota River, and down the Red
River to Lake Winnipeg.

Living at Lake Winnipeg, the Mound-
Builders must have known of the Nelson
River emptying into the tide water of
Hudson Bay, and of the great Saskat-
chawan with its feeders interlocking
with those of the Mackenzie, flowing
into the Arctic Ocean near Alaska.
Pottery has been found on both the Nelson
and Mackenzie, while none of the
Indians living on those streams manu-
factured it when the whites first came
in contact with them.

A careful comparison made between
the mound form of burial and the scaf-
fold and other forms practiced by the
Indians of the Canadian North-west, as
described by the French and English
fur traders and adventurers who first en-
tered the country, shows no similarity.
The tribes have no traditions regarding
these mounds, except in a few instances,
and these have been proved absurd and
without foundation. On the Rainy
River, east of Manitoba, there is a
mound of great size, measuring forty-
five feet in height and several hundred
in circumference.

The Cecropia Moth.

(PLATYSAMIA CECROPIA.)

BY GEO. H. BERRY, LIVERMORE, MAINE.

This is one of our largest moths, and belongs to the genus *BOMBYX*. My first acquaintance with it was made in the spring of 1882, when I found a moth laying her eggs on a small apple tree. I looked for the larvæ several times during the summer, but without success. I, however, found several on other trees, and in the fall, a couple of cocoons on this same tree; from these I raised a couple of fine moths. During '83 and '84 the Cecropia were very abundant. I collected about three hundred cocoons from the road-sides, edges of the woods, apple trees, etc. From these I raised thirty-four perfect moths; the remainder afforded me specimens as follows: Two needle ichneumons, (*PELECIUS POLYCERATOR*); twenty *ORPHION MACRURUM*, ten *ORPHION BILINEATUS*, forty *TROGUS EXCESORIUS*, and a large number of an *ASILUS* fly species unknown to me; there were also a large number of *MICROGASTERS* that I did not attempt to determine. I was surprised to find *PELECIUS* as a parasite on the Cecropia, as the only one I ever raised before was from a white grub, (*LACKNOSTERNA FUSCA*). During '85 I only saw one moth and I expect for a number of years they will be extremely rare.

The eggs are deposited directly on the leaves or twigs, usually one or two in a place, and seldom more than a half-dozen on a tree. They are nearly an eighth of an inch in length, bluish-green when first laid, but changing later to a dull yellowish-white. Their size makes them conspicuous, and as a con-

sequence a large number are eaten by the birds.

The full-grown caterpillar is nearly four inches in length, green in color, with from two to eight tubercles of red, blue, green and yellow on each segment. These are usually set with short, black spines.

The cocoon is firmly attached to a twig, usually on the south side of the tree; is pale brown in color, purse shaped, and is completely waterproof. Within this is a second envelope, oval in shape, and is attached to the outer by numerous threads. The pupæ is dull black, without gloss, and soft to the touch. Many cocoons are destroyed by both squirrels and birds.

The moth is nearly six inches in alar extent, and is one of the most beautiful of our native lepidoptera. The ground color of the wings is a reddish-brown, the edges being surrounded with an irregular wavy border of light and dark drab. About three-fourths of an inch from the edge is a line of white, edged and shaded with red, and in the center of each wing a crescent shaped spot of white, shaded with red and bordered with black. At the outer angle of the front wings is a circular spot of black, edged by a crescent of blue, and surrounded by a patch of red and blue shading. Where the fore wings are attached to the body there is a triangular spot of red, edged with white. Body, red, striped with white; antennæ, feathered; legs densely covered with reddish hair. I have had three of four in which the ground was nearly black and the markings pure white; the entire moth lacking the red shading.

They feed on maple, oak, apple, cherry, thorn, sumac, willow, and I have found them on juniper and cypress. I

have tried to reel the silk from the cocoons, but never succeeded. The silk is strong, but coarse, and would make good fabrics; but owing to the difficulties in reeling, it will probably never be utilized for any other purpose than as a curiosity.

The Ruby-throated Hummingbird.

(*TROCHILUS COLUBRIS.*)

BY FALCON.

This, the smallest of our northern feathered beauties, is about three and a half inches long. His plumage is golden green above, golden red about the throat, purple-brown on the wings and tail, and white beneath. All these hues have a brilliant metallic lustre, which changes with every movement. Although he is small, he is very brave and has no fear of any larger bird. He has even been known to alight on the head of an eagle and pull the white feathers out in mouthfulls, while the royal bird goes screaming through the air in unsuccessful attempts to get rid of his small tormentor. The nest is very small, being about an inch and a half in diameter. It is usually placed on the top of a bough and rarely at the sides of the trunk. the outside is so nicely covered with lichens and bark that it resembles very closely a knob of the tree. The inside is composed of vegetable down, such as that of the downy thistle. The nesting place varies; sometimes an old apple tree is selected as a place of residence, and then again a low shrub in some garden. The eggs, two in number, are pearly white.

What do you think of the appearance of this number?

Mahwa Flowers.

A SUGAR-PRODUCING BLOSSOM.

BY G. D. STORY, CARTERVILLE, MO.

Attention has been publicly drawn of late to "Mahwa flowers"—the corollas of *BASSIA LATIFOLIA*—as a cheap source of cane-sugar. This species of *BASSIA* is a tree attaining to a height of forty to sixty feet, and common in many parts of India, especially in Central Hindoo-stan. It has oblong leaves of firm texture, five to six inches long; these fall in February, March and April, and are succeeded in March or April by the flowers. These last for two or three weeks, and then begin to fall. The falls take place at night and continue sometimes for a fortnight. The fruit, which resembles a small apple, ripen in three months; the seeds, one to four in number, yield an edible oil on being pressed. It should be added that the trees are self-sown, and that they flourish in very poor and stony soil. When the Mahwa tree is in bud, the ground beneath it is cleared of weeds, sometimes by burning. A single tree may yield as much as 500 to 700 pounds of flowers; even a ton is asserted to have been collected from one tree. These flowers have a luxurious but peculiar taste when fresh; when dry they resemble in flavor inferior figs. They form a very important addition to the food of the poorer classes in those districts where the tree abounds, particularly in the neighborhood of woodlands and jungles. They are especially useful in economizing cereals in seasons of famine and drought. It is not, however, as a direct article of food, nor as material for the preparation of a rough spirit by fermentation that Mahwa blossoms are now recommended. It has been affirmed that they may be employed as an abundant and very cheap source of cane-sugar.

"That Rotten Material."

CINCINNATI, O., Aug. 16th, '86.

Mr. Guelf, Editor.

With your permission I would like to say just a few words in regard to the burnt or rotten cloth found in a mound Mr. Wigglesworth described.

Samples of this cloth are quite rare. Very few collectors have any of it. In some mounds quite a supply of it is found, but always in a condition which renders its preservation difficult. Foster in his excellent work, "North American Prehistoric Races," describes the cloth, its texture, etc. Some found in a Piqua County (Ohio) mound is in my possession, and is sealed between glass plates to keep the air from decomposing it. It is woven in a very simple manner; the threads being as coarse as those used in our modern coffee sacks. It was evidently made from vegetable fiber. The Indians had so little of it that it seems to me improbable that they should make a tent out of it (as Mr. W. says). Besides, it is woven so loosely that it would form no protection against rain. It is not strong, and a wind would tear it. It might have been used to cover the face or part of the body of distinguished dead; and again it might have been used by the medicine men or in ceremonial proceedings. We never heard of a tent being used in connection with burying. The nearest approach to a tent is the modern method of the North-west tribes of burying the dead in lodges raised on poles, with the covering of a few boards.

At any rate we cannot POSITIVELY say what the cloth was used for. Each has a right to express his opinion, of course. I have given mine.

W. K. MOOREHEAD.

The Red-tailed Hawk.

(*BUTEO BOREALIS.*)

BY J. W. JACOBS, WAYNESBURG, PA.

While strolling through the woods on the 25th of April, I spied a large and bulky nest, in one of the tallest oaks in the woods. Knowing that there was a nest of this hawk in the vicinity last season, and thinking this was the old nest, I did not take much notice of it. I had hardly gone a hundred yards further when I saw another nest, similar to the first but not so high. I threw stones at this nest, but could scare no bird from it. On going back to the first nest, I thought I could see a large head peering over the edge. I picked up a stone and tapped on the tree, and as I did so, a large Red-tail flew from the nest. Knowing that there was a fine set of eggs in the nest, I began at once to ascend the tree, which was so large that I could not reach half-way around it, but the bark was coarse, and I made my way with difficulty to the first branch, which was about twenty-five feet from the ground.

Gaining the first branches, I could now make my way to the nest very easily. When I was about half-way to the nest, I heard the cry of the mother bird, and on turning, saw her perched on a tree about a hundred yards away, and just as I reached the limb nearest the nest, I heard the cry again; this time she was not forty yards away.

A moment later and I looked for the first time upon a set of eggs of the Red-tailed Hawk. Thinking I could carry them to the ground safer if they were lighter, I began to blow them. I had just begun blowing the first egg when I

was frightened so badly I almost chocked on my blow-pipe. There, not fifty feet from me, was the mother bird, perched on a limb, uttering those prolonged screams, and beating the branch impatiently with her wings. Not having my collecting box with me, I dropped an egg in each coat pocket and started for the ground, which I reached in safety. The eggs were two in number, and measure 2.50x1.87 and 2.56x1.86. They exhibit great variation, both in size and color. One is dirty white, spotted with large blotches of chestnut and amber brown, and some faint markings of lilac; the other is much darker. The nest measured over four feet in diameter, and was composed of large sticks and twigs, lined with leaves and moss; was almost flat on top, and was placed in a sort of horizontal fork, eighty-five feet from the ground.

CORRESPONDENCE.

Thank you for your favor of No. 12 of your magazine. It seems very creditable, and you no doubt get a great deal of enjoyment and practical experience from it.

W. R. DUDLEY,
Professor of Botany,
Cornell University, Ithaca, N. Y.

While planting corn last spring, I found two perfect war-points and a common arrowhead. The latter was almost perfect and just one-half inch long. You said the department on archaeology would continue just as long as the readers took an interest in it. Well, if they are all like myself, it will not stop soon.

HARRY FOX, Murdocksville, Penn.

While camping at the lake, last month, we noticed, among other peculiarities of bird life there, that the Swallows were very pugnacious, attacking Kingfishers,

Woodcock; Duck, Great Blue Heron, and on one occasion a Swallow was seen to attack a Pigeon Hawk, but he evidently got the worst of the bargain. We also observed a perfectly white Swallow among a large flock of Barn Swallows, but could not draw a bead on him.

Ye Editor.

On the 25th of June I caught a young Great Horned Owl, (BUBO VIRGINIANUS). He is nearly full grown, and although I have had him over a month, he is not in the least tamed. I feed him on rats, mice and meat scraps. I found a sunflower with lignate corollas in the centre of the head. It is the first I have ever seen, and do not know whether it is a rare occurrence or not.

ARTHUR J. COX, Iowa City, Ia.

The following is a list of eggs collected by me this season :

April 18—One set of Mourning Dove.

19— " " Am. Robin.
20— " " Card'l Grosb'k.
21— " " Common Crow.
22— " " Pewee.
30— " " Woodcock.

May 1—One set each of Belted Kingfisher, Red-and-buff-shouldered Blackbird and Bluebird.

May 2—One set of Meadow Lark and Chipping Sparrow.

May 3—One set of Meadow Lark.
4—Two " Yellow-shafted-
5—One " Chewink [Flicker
6— " " Bl'k-cap'd titmice
9— " " Chewink, Meadow
Lark, Black-capped Titmice; two sets
of Blue-gray Gnatcatcher, and seven
Cowbird's eggs in one Pewee's nest.

May 12—One set of Blue-gray Gnatcatcher, and two sets of Yellow Warbler.

May 15—One set of Wren and Bee Martin.

J. W. JACOBS, Waynesburg, Penn.

The American Crossbill.

LOXIA CURVIROSTRA AMERICANA.

BY NAT U. RALIST.

The American Crossbill, known also by the name of Red Crossbill, is one of the handsomest of our birds, as well as one of the most peculiar. These birds have long been celebrated on account of the singular form of their beak, from which they derive their name.

the ordinary faculties of birds, and to be as capable of obtaining its food as any of the straight-beaked birds.

The Crossbills obtain their principal food, the seeds of firs and pines, by tearing up the cones. They bring the points of the mandibles together—which they can do so as to pick up a very small seed—and insert them into the cone, when a powerful lateral movement widens the opening quite sufficiently, and the tongue, which terminates in a singular movable scoop, is inserted to



In these birds the two mandibles—which are rather long, thick at the base, and much curved, crossing each other at the points, when the bill is closed. In different individuals, even of the same species, the upper and lower mandibles are found variously directed to the right and left. The structure, when first seen looks not unlike a malformation, and to prohibit the bird from picking up seeds or feeding itself in any way. But when seen feeding, it speedily proves itself to be favored with all

detach the seed. It is also very fond of apple-pips, and, settling on a tree where ripe apples are to be found, attacks the fruit with its beak, and in a very few moments cuts a hole fairly into the core, from which it daintily picks out the seeds and eats them, rejecting the ripe pulpy fruit in which they have been enveloped. As the Crossbill is rather a voracious bird, the havoc which it will make in an orchard may be imagined.

The male, as is the case with all birds, has the most beautiful plumage. The

throat and breast are red, with here and there a few feathers of drab and yellowish-green; while the head and back are prettily colored with a variegated mixture of green, brown, and red, all of which have a peculiar metallic lustre; wings, black, turning to a brownish hue at the shoulders; abdomen, drab; tail, black; tail coverts, bright red; bill, black, and three-fourths of an inch in length.

Although Dame Nature has not decked the female with quite so lavish a hand, she is, nevertheless, very prettily arrayed. The throat, head and breast are clothed in a mixture of yellow, green, red and drab; back, red, green and black; tail feathers, black with white margin; tail coverts, bright yellow; abdomen, drab; wings, black and white. The total length of the Crossbill, from tip of beak to extremity of tail, is six inches. The tail has a very deep notch in the end, which is very conspicuous when flying.

The nest is generally built in fir trees in a somewhat secluded spot, and contains generally four greenish-white eggs, speckled and dotted with varying shades of lavender-brown, with a few heavy surface spots of dark purple-brown. The eggs average in size .75 by .56.

OBITUARY.

Frank K. Rising.

We now have the sad duty of recording the first death in the ranks of our subscribers. Frank K. Rising, the well known writer and rubber stamp manufacturer, died at his home in Lena, Ill., on June 29th, 1886, at the age of 19 years. He was a writer of more than ordinary ability, and had written a number of articles on scientific topics for a great many journals, including the

COMPANION, under the nom de plume of "Kinney." His friends and relatives share the sympathy of the Editor in their bereavement.

Limestone.

Read at the first annual meeting of Chapter 760 of the Agassiz Association, Jamaica Plain, Mass.

Continued from last issue.

In making mortar, the quick-lime is mixed with water and silicious sand. The strength of the mortar depends on the formation of a compound between water, lime and sand. The finer the sand, the more thorough the combination. Hydraulic cement is so called because it will set under water. It is made from limestone containing silica and alumina. Less sand is needed than with ordinary lime.

Almost all shells effervesce with hydraulic acid in the same manner as calcite does, showing that they must be composed of calcite or carbonate of lime. In the ocean, vast quantities of carbonate of lime are held in solution. This is used by the coral polyps and the mollusks to make their skeletons. When they die, their shells are left behind them and accumulate on the bed of the ocean; and in time they unite and form limestone.

Coquina, which is found in large quantities in Florida, is a variety of limestone in process of formation. Although it is porous and appears very friable, it is really quite firm; the shells uniting strongly wherever they meet. In course of time the spaces between the shells will be filled and we shall have solid rock containing fossils. After considerable time has elapsed, it may become crystalline, as in marble and calcareous spar; and all traces of the

fossils will be obliterated. Crystallization is a sign of great age.

As I said before, the ocean holds vast amounts of carbonate of lime in solution. This is deposited in the same manner as salt; by the water evaporating in certain places where it has been isolated by some change in the form of the earth's surface, leaving a bed of limestone. Limestone is not formed in this manner at the present time, but we have good reason to believe it was formed so ages ago. A similar method is that which forms calcareous tufa, which is limestone deposited by water; such as mineral springs, geysers and rivers.

Water leaking into the roof of a cave often contains calcite in solution. The water evaporates leaving the calcite. In time quite an amount of calcite will be left in the form of an icicle, called a stalactite. When more water leaks through than can be evaporated, some falls to the bottom of the cave, and the calcite in it forms an inverted icicle called a stalagmite. Sometimes these stalactites and stalagmites meet, forming pillars.

The granular and crystalline varieties of limestone are called marble; but marble is not a scientific name, and may mean any rock that is calcareous and takes a polish. The finest and purest white marble is used for statuary. The finest marble comes from Carrara, Italy; the Island of Paros, whence the name Parian; from Athens, Greece; and from Ornofrio, Corsica. Many of the fine Greek statues are made from Parian marble. The statuary marble found in the United States is not of a good quality, but good building material is abundant. The best kinds of building marble are not excelled by granite for durability.

Chalk is a white and earthy variety

of limestone. This must not be confounded with the chalk used to mark on a blackboard, which is made from clay. Chalk is abundant in Europe, but is not found in America. When examined by the naked eye, it seems to be destitute of organic remains, but when seen under the microscope, it appears to be a mass of shells. Chalk is composed of the shells of Foraminifera. Although the chalk which we see now was formed ages ago, we have good reason to believe that chalk is being formed at the present time. There are thousands of square miles in the deeper parts of the ocean where the dredge brings up little more than a gray calcareous slime or ooze. When examined with a microscope, it is found to be composed principally of Foraminifera. When this ooze is dried and pressed, it forms a white rock like chalk; it is, in fact, a modern chalk. The crystalline varieties of limestone are termed spar. Many of the crystals are very beautiful. Nail-head spar and dog-tooth spar are so called because of their resemblance to those objects. Iceland spar is a transparent variety. It derives its name by its first being found in Iceland. Satin spar is a finely fibrous variety with a satin lustre. Marl, which is of great value in agriculture, is a mixture of carbonate of lime with clay. It often contains fossil shells.

THE END.

Mr. J. H. Martin, in "Science Gossip," says that a good method for preserving fungi is to place them in a solution of one part calcium chloride (chloride of lime) and ten parts water. This will change the phosphates of the fungus into phosphate of lime, after which they will be found to keep well.

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We request all of our readers to send us a description of their Collecting Excursions, their Finds, or any items they may think will be of interest to the readers of the **COMPANION**.

CHARLES P. GUELF,
EDITOR AND PUBLISHER,
Brockport, New York, U. S. A.

ASSOCIATE EDITOR,
H. F. Thompson, Indianapolis, Ind.

RANDOM NOTES.

The Southern Geologist has suspended publication.

The NATURALISTS' COMPANION and the Young Naturalist's Journal both one year for only 50 cents.

P. T. Barnum offers \$20,000 for the skin of a sea serpent such as was believed to have been seen off Rockport, Maine.

W. G. Talmadge, Hartford, Conn., has our sincere thanks for a copy of "Birch Bark from the Adirondacks."

We were somewhat delayed in issuing this number by our paper failing to come to hand promptly.

G. D. Story, Carterville, Mo., has our thanks for a fine specimen of the mineral sphalerite.

Unless some of our advertisers begin to settle up soon, we shall be obliged to place the bills in a lawyer's hands for collection.

Parties desiring to secure a fine specimen for their cabinet cannot do better than purchase one of those sword fish swords of A. C. Randall.

In overhauling our sanctum recently, we discovered several copies of No. 1, Vol. 1, which we will sell at five cents each.

The fall of a meteor on ice was lately witnessed on the coast of Norway, a hole a foot and a half in diameter being made through eight inches of ice.

Parties in want of fine specimens at extremely low rates should review the advertisement of A. N. Fuller, of Lawrence, Kansas, on another page.

Students of archæology should give some attention to mythology. They will find that study one of great interest, and there is ever a field of wide research open.

Publishers of scientific magazines will please send two copies of their journals — one to this office and one to our associate editor — and we will return the compliment.

Circumstances renders it impossible to give our readers a history of our camping excursion, as we formerly intended. Sufficient it is to say that we enjoyed ourselves immensely, and returned to our sanctum looking as brown as Indians.

Crystals.

BY W. S. BEEKMAN, WEST MEDFORD, MASS.

The majority of us, busy with the cares and trials of an active life, have but little time to occupy our attention with the intricacies of nature, and when we come in contact with a friend who does have the time and taste, we are somewhat impressed by his ardor, and wonder, when we leave him after a pleasant half hour's talk, why it is that we have never found such beauties in the objects that are in our daily avocations. Crystals are not such an uncommon thing as we are apt to suspect, and perhaps, one of the things used several times every day of our existence will consist of thousands of perfect symmetrical figures. But when a room full of company, who have asked to be introduced to a few of these novelties, are asked to look at these finely formed particles, one and all fail to recognize the substance, but will comment upon its regularity. This substance is exhibited to them in a slightly magnified condition, and does not seem possible to some that they are little grains of sugar. I wonder how many of the readers of this magazine, not directly interested in looking at magnified objects, can give a correct description of the form of a grain of sugar. There may be many who, when looking under a magnifier, may recognize a grain of sugar by its form, when mixed with a number of other forms, but when using a spoonful of sugar at the table, do they see the form of each little grain of sugar, as it rolls over and over in its downward course, as it appears under the glass? If not, that may be one reason why we find it discouraging work at times, to

proceed intelligently in our study. When we sit at a magnifier, we are ready to note all it may show; but, when it comes to remembering half we have thus seen, it is another task.

A college mate of mine, who took the honors in chemical work, left for the West some time ago. Quite recently he sent me a little package by mail, from where he was at the time in Wyoming, containing a number of curiously shaped particles. A note accompanied the package stating how he was walking in a valley, and observed these singular grains, and that he was quite surprised to find they were all nearly of a shape and size. He wanted me to give some explanation as to why they should all have been worn in that peculiar shape. I wrote back that they were not water-worn, but genuine crystals, called magnetite, and were formed according to laws of crystallization, that has thus far eluded our searching grasp almost completely. In answer, he remarked if that form should have occurred during a chemical operation, he would instantly have recognized a substance crystallizing in the octahedral form, of the regular, or cubical system, but out in the valleys, like the person at the table, natural inference was lacking.

The ordinary idea of crystal, appertains to rock crystal, or some bright clear substance, as crystal glass, or "clear as crystal."

Rock crystal, as found abundantly in Nature, is a beautiful substance, and has been admired by us all. It is found in nearly every portion of our country; most frequently as a fine brilliant or drusy coating in the crevices of rocks. It is generally stained various shades of yellow, due to iron. In a few localities the small brilliant points, instead of ab-

ruptly coating the rock, are raised upon a pretty pedestal, as it were, and are sometimes from a quarter of an inch to a foot in length. These pedestals are peculiarly shaped, if we notice, and are regular six sided prisms, covered or terminating in six sided pyramids, which are the points covering the rocks in our first observation, only; as they were not so prominent, our brief glance failed to notice the regularity of their sides.

At one locality the crystals are pointed at both ends, and are exceedingly brilliant. These are the Herkimer crystals, and little gems they are. One can, in these little crystals, find objects for their cabinets that will be a source of more pleasure than any other specimens they may possess. To say they are beautiful, is but faintly describing them. Of course there are to be found parties who can show you Herkimer crystals that may fail to excite your interest, in as much as they are inferior specimens. The complications of the hexagonal system, as observed in a handful of these little crystals, offers a vast field for observation. I have before me a number of these gems, and will endeavor to give some idea of their beauty. A little box containing a dozen crystals, about two-thirds by one-half inch in size lying on pink wool, are of dazzling brilliancy, and only lack splendor to outdo so many cut diamonds. But to place this box of brilliants, worth the small sum of a dollar, by the side of a similar box of native diamonds, worth, if of equal size, thousands of dollars, and offer them to one hundred people, successively, who knew nothing of their value, ninety-nine would invariably select the quartz brilliants. Another box contains a few "twins," of great whiteness, but in the centre is a glossy black speck of

free carbon; giving an excellent contrast of the two extremes of light and dark; transparency and opaqueness. One "twin" is nearly like figure 194 in Dana's, a rare geniculation. The next box contains seven greenish-black crystals, where the impurity is diffused through the quartz. On holding one of these crystals to the light, one can see the greenish form is enclosed by a clear layer of quartz, forming hidden crystals. Passing along, I come to a beautiful, clear, regular crystal, with not a sign of an imperfection visible until it is examined by transmitted light, when there is perceived a very dim shadowy outline of a crystal, which is a "phantom." This whole paper could be used up in thus giving inadequate descriptions of these lovely forms of crystals.

We will send 100 sheets of unruled writing paper post-paid for 25c.

We can supply all back numbers of this paper at five cents each.

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Chas. H. Marsh, the well known ornithologist, has gone on a collecting expedition in the San Diego mountains. We wish him the best of success.

Through the kindness of the publisher we have received a couple of numbers of the popular "Humboldt Library." It is one of the cheapest and best scientific magazines published, and treats on all subjects of interest to the scientist. Price only \$1.50 per year or 15 cents per copy. Address the publisher. J. Fitzgerald. 393 Pearl St., New York.

The Oological Collector.

BY G. H. SELOVER, LAKE CITY, MINN.

There is considerable difference in the use of this term and the more common one, "egg collector." As defined in the last issue of this magazine, the "egg collector" is one who strives to allay the stings of conscience by taking only one or perhaps two eggs instead of the whole set, and argues that the bird "can't count" and don't know the difference.

It is evident that this kind of collector generally cares nothing for the eggs he takes, except as mere curiosities to be shown to friends, and to be kept and continually added to, for fear that the boy on the other side of the street will "beat" him and "show off" the larger assortment of eggs. As a rule, this class of collectors know very little about the owners of their eggs, and is only interested in "getting all he can and keeping all he can get."

How different from those who make the birds their study and the observation of their habits the occupation of their leisure hours? These persons desire to learn all they can about the feathered tribe, and, as the most convenient and very best way of doing so, they collect the eggs and nests of the various birds; and not to "show off" as you would fine animals or curiosities, but to study. In fact, the collections of the most studious, and of those who derive the most benefit from that study, although sometimes it may be very large and rare, are seldom seen or heard from. They do not spend their time on eggs and birds for show, but for silent study and for the benefit it will give them.

It is often stated that it makes no dif-

ference to a bird if you take an egg or two from the nest; but this is disproved by facts and by ordinary observation, for there are very few birds which will not give vent to cries of distress on returning to a nest from which one or two eggs have been taken. Let the upholders of that doctrine take the trouble to watch a few birds and I am convinced that they will find themselves in the wrong.

Then, again, a collection of single eggs has no scientific value. To be sure, they represent the fact that such and such eggs were laid by such and such birds; and only this one fact is attached to them. But, on the other hand, as a full data should be kept with all sets, you have the scientific name of the species, the time of breeding of the species in a given locality or latitude; some idea as to its geographical distribution, the state of incubation of the eggs as well as their number, the position, and the material of which the nest is composed—a whole history and description of the breeding habits of the species. With this system an oologist can set down and in a few minutes learn these facts concerning birds which do not breed within a thousand miles of his home.

Some contend that this way of collecting is "so cruel," and yet they say "the bird cannot count," and if so perhaps the bird would not notice the difference whether a half or the whole of the set was taken. And as they advise the collecting of single eggs, or eggs in pairs—and only for show—why cannot sets be collected, considering the good that arises from it? And as they say that the bird replaces those which are taken by the "egg collector," why can't she forget them all and deposit another full complement?

As far as cruelty is concerned, if there is any cruelty in it at all, there must be as much in taking a half as the whole of a set.

Then there is another thing which the "egg collector" does, which the student of oology would not think of doing. Most of them, instead of keeping their "collections" in boxes or cabinets for the purpose, either use them as ornaments (?) at their homes, by stringing them and hanging them up about the rooms, or sticking them on pasteboard or cloth for easy manipulation while "showing them off."

This, more clearly than anything else, shows that the vocation of the "egg collector" varies greatly from that of the oological student. I, for one, am glad to note the great progress of the later and the great retrogression of the former class of collectors; and I hold that any person who attempts to propagate the old ideas of the "egg collector" should be considered an enemy to all true progress in the science, and that any and all such attempts should be frustrated.

A Visit to a Zinc Mine.

BY C. S. MASON, EASTON, PENN.

A short time since I went out on a tramp to Fridenville, (Pa.) after minerals. This town has probably 500 or 1,000 inhabitants, and lies nestled among the hills, being four miles from Bethlehem and five miles from Allentown. Here are found extensive deposits of zinc. Two large pits or beds are now being worked. Each bed is about 350 feet wide by 1,000 feet long. All workings in the mine are carried on in the open air just the same as in marble or limestone quarries. Scarcely any

tunnels are made, excepting between wide layers of rock, where the deposits of zinc silicate (calamine) are found.

The ore is hoisted out of the mine by the aid of a small dummy engine, which works independent of the large pumping engine, a description of which may be found in the *Scientific American Supplement*, Vol. 11, No. 32, August 5th, 1876. But for those who are unable to procure the paper, I will copy it as I found it.

"The engine has a pumping capacity of 15,000 gallons per minute, and can be run up to 19,000 gallons per minute in case of an emergency. The water is raised from a depth of 350 feet.

The "President" (the name of the engine) weighs 650 tons, and including the pumps and boilers, the total weight is 1,000 tons.

The cylinder is $110\frac{1}{4}$ inches in diameter; length of stroke, ten feet. The heaviest pieces of iron in the engine are the sections of the walking-beams, each of which weigh twenty-four tons. The fly-wheels weigh seventy-five tons each; crank pins one ton each. The piston-rod is fourteen inches in diameter; the cross-head weighs eight tons; the connecting-rods have nine-inch necks and are fifteen inches in the middle, forty-one feet two and one-half inches in length, and weigh eleven tons each. There are also two air-pumps, each fifty inches in diameter.

The engine-drives, or plunger-pumps, each thirty inches in diameter by ten-foot stroke; and four lifting pumps, each thirty-one and a half inches in diameter by ten-foot stroke. The plunger-pumps are uppermost and stationary, the lifting pumps being in the bottom and movable, so as to go up and down as the shaft is sunk. To handle these lift-

ing pumps and for hoisting or lowering them at pleasure, a steam capstan, capable of lifting fifty tons vertically, is used. The capstan is worked by a series of strong gearing, a drum and a steel wire rope. With this capstan, if anything goes wrong with the pumps, they can be taken hold of by the top, pulled out of the water, repaired and put back again in a very short time."

This is about the largest fixed single engine in the world; that at Harlem Meer being a compound engine with one cylinder within the other. The Scientific American Supplement is illustrated with front, side and horizontal elevations.

It was thought of very strongly at one time to lay iron pipes from Fridenville to Philadelphia to supply the latter city with drinking water, as the water which is pumped out of the mines is very clear, clean and pure. For some reason, however, this giant scheme fell through.

While a description combined with illustrations may be very exact in every detail and part, still this fails to convey the immensity that immediately stamps itself on the mind of one who looks on the engine for the first time.

The engine, works and ground belong to the Lehigh Zinc Company, who have erected large smelting and ore reducing works. This company have, within the last year, added oxide works, which they moved from Bergen Point, New Jersey.

In and around the mine some very fine specimens of massive blonde, calamine, sulphur, iron pyrites, calcite, quartz, greenochite, blue and red carbonates of zinc, and various coatings are found. Iron pyrites or sulphur and blend is called "mundig" by the miners. As a general rule, the miners are willing to give or show where fine specimens are to be found.

Relaxing Dried Skins.

Select the skin or skins to be relaxed and remove all the cotton from the body, head, eyes, etc., and refill with wet cotton, also wrap a quantity of the same around the legs. Procure a tin or wooden box of a size sufficient to hold the skins to be relaxed, fill it full of well wet sawdust. Now wrap the skin in a sheet of clean white paper and bury it in the sawdust. Let the skin remain from two to five days, or longer, depending upon its size; if left too long the feathers are apt to start. When soft enough take the skin from the box and remove the cotton from the inside. Turn the skin completely inside out to base of beak, then turn it back again. This will break the stiffness and make the feathers assume their natural appearance; any bumpy place should be manipulated with the fingers until made soft. Any bend or crimp in either the wing or tail feathers can be readily removed by holding in the steam from a kettle. When the skin is prepared as above, proceed the same as with a fresh one.

An Unusual Friendship.

June 11, 1884, I saw what I took to be a Robin's nest in a maple tree on a public avenue. Upon ascending, was surprised to see a Robin and an English Sparrow fly from the nest, which was like an ordinary Robin's nest, except being thickly lined with feathers, which were well embedded in the cement of the outer nest. It contained three eggs of the Robin and six of the Sparrow, all evenly and highly incubated. The eggs were not intermingled, each kind being on a side in a slight depression, but not separated from one another. The

feathers which lined the nest, except the small ones on the bottom, were stuck quill ends in the cement, and the tops or feather ends curved inward, so as to nearly conceal the eggs. The Robin and Sparrow had been setting side by side on their respective eggs.

It may be mentioned that these birds are usually enemies.—THE OOLOGIST.

Do Flying-Fish Fly?

The question "Do Flying-Fish Fly?" seems to me should have long since been settled in the affirmative. Many years ago the writer was engaged in trading voyages in the South Pacific ocean, where the flying-fish were to be seen daily. They would generally rise in shoals, which flutter from wave to wave from fifty to one hundred yards before settling in the sea. Again individual fish would rise, flying comparatively higher, their flights sometimes being from one hundred and fifty to two hundred yards long. The school fish were the smallest in size, and would bury in the crests of the waves in crossing them, while the individual fish would, at most, simply touch the spray of some of the waves in passing. These last fish seemed to range from fifteen to twenty inches in length, were quite thick, had a reddish color about the head and shoulders, and in flying often made curves from a straight line, as if avoiding the vessel or some danger in the sea.

There could be no spring or jump in the matter, except to emerge from the water when starting, the flight being caused by the wings, which vibrate as quickly and like those of the hummingbird. Further than all this, it is only necessary to examine the wings of a flying-fish and it will be seen they are

too long, yielding and fragile to admit of using in so dense a fluid as sea water. My theory is, that the flying-fish used their tails and small fins to raise themselves out of the water, and made their flight by the large fin wings while in the air; further, that they touch the waves simply in passing as a rest, the larger fish being stronger making longer flights, toward the end of which they seemed to sail with wings extended until they drop into the sea.—AMERICAN ANGLER.

To Remove Grease from Bird Skins.

It is accomplished by the following method: When the inside of the skin is greasy sprinkle liberally with plaster of Paris, and scrape with a blunt knife, removing the plaster from time to time until the grease is thoroughly absorbed. White birds are very liable to be greasy; if it be the feathers, wash the greasy ones with turpentine, sprinkling with a thick coat of plaster, which should be removed as soon as it becomes saturated with turpentine, and more applied. The feathers must be moved and brushed about to permit the plaster to penetrate. Finish by shaking or blowing until all the plaster is removed. This is a slow method, but the results amply repay one for the time spent.—HOOSIER NATURALIST.

It has long been a question of doubt as to how far beneath the surface the roll of the ocean could be felt. A diver at work on the Oregon at a depth of 120 feet found it so heavy that he could not keep his position while making fast to a trunk which was to be hoisted up.

EXCHANGES.

THIS column is open to all subscribers, who may insert exchanges free of charge. NO advertisements admitted to this column under any circumstances, and we shall reserve the right to insert no exchanges which are merely intended to secure cash purchasers.—Ed.

BURT LONGYEAR, Leslie, Mich.—One good specimen of petrified wood for every good labeled curiosity.

A. J. COX, box 1713, Iowa City, Ia.—Polished or unpolished Devonian corals for fossils, Indian relics, minerals or marine specimens.

GLENN STEARNS, Circleville, Texas.—

—A microscope, cost \$3.00; a book, "Empress Josaphine"; and a set of eggs of Scissor-tailed Flycatcher and Cardinal Grosbeak, for a good pair of climbing irons. Write, stating style.

C. D. PENDELL, Waverly, N. Y.—I would like to exchange some of my duplicate minerals and a magic lantern for books on any branch of natural history, a magnifying glass or offers. Send for list of minerals.

C. W. STUTESMAN, Bunker Hill, Ind.—I wish to exchange my 16-page coin and stamp catalogue with other collectors and dealers in coins, stamps, relics, etc., or for 15 var. foreign stamps, or 3 good foreign coins.

QUERIES AND ANSWERS.

Mrs. L. A., Bridgewater, Vt.—Bird lime may be made as follows: Take one pint of linseed oil, put it in a pot of not less than three times that capacity; place over a slow fire and stir while boiling with a wooden spatula; continue until it is thick as required. This can be determined by cooling the spatula in water and trying if it will stick to the hand. When sufficiently done pour in

cold water and it will be ready for use.

W. W. P., Clark, Pa.—We believe Wilson's American Ornithology the very best book published for the money. It is very fully illustrated, with over 100 full-page colored plates, representing upwards of 500 American birds, in their true plumage. The work is complete in three vols. of some 1,500 pages, describing the habits and nature of every known bird in the U. S. Price, per set of three vols., cloth, at this office, \$18.00.

We have some specimens sent us for identification which we will endeavor to name in our next number.

The South has recently been very severely shaken by earthquakes.

We shall soon issue an "Agent's Directory" for John Carmichael, St. Raymond, Quebec.

We have an interesting paper, for the September issue, from the pen of Wm. M. Beauchamp, D. D., entitled "Surface Finds," and for which he has our sincere thanks. Archaeologists should not fail to procure a copy of the number containing the article.

We notice that one of our subscribers, W. H. Plank, Wyandotte, Kansas, has taken upon himself the publication of a neat little magazine, entitled "The Agassiz Companion." It is well edited, and with a little energy and "push" on the part of its editor, it will make a fine success.

For only \$1.00 (postal note) we will send Davie's famous Egg Check List and Key to the Nests and Eggs of N. A. Birds, describing the nests, eggs and breeding habits of every North American bird, and one year's subscription to the COMPANION. The regular price of the book alone is \$1.00.

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October, 1886.

No. 3.



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VOL. II.

BROCKPORT, N. Y., OCTOBER, 1886.

NO. 3.

THE BUTTERFLY.

Behold, ye pilgrims of this earth, behold!
See all, but man, with unearned pleasure
gay;
See her bright robes the butterfly unfold,
Broke from her wintry tomb in time of
May.

What youthful bride could equal her array?
Who can with her for easy pleasure vie?
From mead to mead with gentle wing to
stray,
From flower to flower on balmy gales to
fly,
Is all she hath to do beneath the radiant
sky.

—Science Series.

Wild Flowers under Cultivation.

BY GEO. E. BRIGGS, PEEKSKILL, N. Y.

EVERY few cultivators of plants realize the beauty and fragrance of some of our native plants. Those who have experimented in cultivating wild flowers, universally agree that many may be grown in our gardens or greenhouses, and are as ornamental as some of our rare and delicate foreign plants.

I have spent much time and labor in testing the hardiness of many of our wild plants, and can give the following as some of the results of my investigations.

One of the most gorgeous of our late swamp plants is the Cardinal flower, (*Lobelia cardinalis*). In August its long spikes of beautiful cardinal flowers may be seen in abundance in our

rich swamps. If some of these plants be cut off close to the ground and transplanted with plenty of its native earth to a damp spot in one's garden, it is most always sure to live and thrive, and the next year 'twill come up and bloom in profusion. The best, and really the only fit time to transfer it to the garden, is in the fall of the year.

Another curious, though not particularly handsome plant, is the *Chelone glabra*, or snake's head, sometimes called "balmony." It is one of our common swamp inhabitants, and is easily propogated.

Many persons become very enthusiastic over the numerons grand and beautiful lillies that are displayed in every conservatory and flower garden. They are not aware of the fact that our wild woods produce two lillies, *Lilium canadense*, or the yellow lillie, and *Lilium superbum*, commonly called Turk's cap, which, when brought into our gardens, may be easily subjected, and forms a fine addition to any collection. I have seen the Turk's cap in its native haunts with fifteen handsome drooping flowers that might well adorn any garden.

They flower in June, and travel very slowly. The time to remove them is in the autumn, when they should be cut down to about three inches above the root. New stems will appear the following year.

The birthroot, or bath flower, *Trillium*

erectum, is a very interesting plant on account of the symmetry of its parts; they being all in threes. The large purple flower is also gorgeous, but on account of its vile odor it is not generally admired. It is easily cultivated.

Most of our commoner wild violets will grow under cultivation. I would mention the yellow species and the sweet scented white violet, (*Viola blanda*), as easily grown and very pretty.

Other plants are the fringed gentian and the closed gentian, (*Gentiana crinita* and *G. andrewsii*); the *Heliumum autumnale*, or sneeze weed; and the golden aster, or *Chrysopsis manana*.

Many other species of our native flora might be brought under cultivation. It only requires trial and patience on the part of the grower. It affords a large field for practical work, and I hope that in the few years to come much work may be accomplished in this line of investigation, and that our gardens may be increased by many handsome new wild flowers.

Notes From a Long Island Collector.

BY ARTHUR J. HOWELL, BROOKLYN, N. Y.

I was at Lake Grove, Long Island, from May until September, this year, and as I took a great deal of interest in studying the habits of our little feathered friends, I thought some of the readers of the NATURALISTS' COMPANION might like to read a few of my notes and experiences.

The Yellow-shafted Flicker, or "High-hole," as it is called, is quite common in this locality, but very little is seen of him after the breeding season, which is from the middle of May to the first

of June. Then, and when the young are hatched, you may hear his loud, rattling call quite frequently, and if you should knock on a tree which had a hole in it, you would be quite likely to hear a response from a number of rather uncultivated voices in the depth of the hole. The eggs are merely deposited on some chips at the bottom of the hole, which I have generally found in an apple tree; it may, however, be frequently found in oak or poplar trees, where it is to be found anywhere from four to fifty feet from the ground; the average height being about ten to fifteen feet.

On the 22d of May I took a set of six eggs, which were partially incubated, and another set of the same number on June 1st, which were fresh. The latter looked especially beautiful to me, as they lay in my hat in the sunlight, the yolk appearing through the glossy white shell. Two weeks later, on June 16th, I went to the nest again, and found seven eggs, which, out of pity to the birds, I did not disturb. The bird is very cowardly when its nest is approached, flying away without so much as a look back.

The Kingbird is another common summer resident, but not particularly liked because of its pugnacious habits. It will attack almost any bird that happens in its way, and a Crow without several Kingfishers after him is an uncommon sight.

While out collecting one day, I noticed a Catbird stealing slyly toward a Kingbird's nest, with the intention, probably, of sucking the eggs. In my indignation, I was about to throw a stone at him, when the owners of the nest appeared, and with loud screams, drove the intruder away. Forgetting

my indignation, I decided to have that nest for my collection; I accordingly ascended the tree and found that the nest contained two eggs, which I left, desiring the set. Two days later, I went there, but, alas! the eggs were gone, which was evidence that the Catbird had got the best of the Kingbirds.

About the first of June, the Kingbirds may be seen flying about with nest-building materials in their beaks, coming even to the door-yard to pick up pieces of thread, string or rags, and by following them, you will find that they almost always bring up in an apple tree, on the end of a slender, horizontal limb, on which they build a strong and compact nest of hay, straw, wool, string, shreds of cloth, and feathers, and in which they lay their beautiful eggs, white, spotted with dark brown and lilac, generally forming a wreath around the larger end.

One peculiarity of the season that I noticed in this and other species, is the small number of eggs they lay. All the books on the subject that I have ever seen gave four or five as the number of eggs laid by the Kingbird, while this year I have found one set of four and three sets of three each.

Among our most common birds may be mentioned the Robin, the Catbird, and the Chipping and Song Sparrows.

The list of our Fringillidae also includes the Field Sparrow, the Grass Finch and the Chewink.

I have written this with the hope that some other collector on the Island will have something to say about his experience. What we need, also, is a reliable work on the birds of Long Island. Who will write it?

Exterminate the English Sparrow!

Nesting of the White Eye or Florida Towhee.

(*Pipilo erythrophthalmus, var. allenii.*)

There is a very great contrast between the Red eye and White eye Towhee in their nesting, to almost take them to be two different species of birds, instead of only a variety of the same species. The Red-eye I have never found except on the ground in a bunch of briars, grass, or bushes, with the nest covered over on top, while the White-eye chiefly builds on young pine trees from three to ten feet high, with nest uncovered. The nest cannot be recognized from that of the Yellow-breasted Chat, unless the bird is seen leaving the nest. The eggs of the White-eye are also smaller than those of the Red-eye, also much lighter in color, and the markings not so distinct. On May 18th, 1885, I found a nest containing three fresh eggs, in a pine tree, three feet from the ground; found several with incubation too far advanced to take; also several with young in different stages. Both the Red-eye and White-eye Towhee breed here; they both breed twice each season.—GEO. NOBLES, Savannah, Ga., in *S. S. Oologist*.

Naturalists, both old and young, will want some entertaining and instructive magazine with which to pass away the long winter evenings now approaching. Why not take the *Companion*? It is certainly the cheapest, and, as one of our friends puts it, "contains more good reading to the square inch than is to be found on a whole page in the majority of papers." We leave the reader to judge as to the truthfulness of this statement.

As Others See Us.

WELLESLEY, MASS., Oct. 20th, '86.

Dear Sir:—

I will try and write you something for your paper, which, by the way, is the best one I know of, excepting the *Ornithologist & Oologist* and the *Auk*. I take great pleasure in reading it, and if possible will get you a subscriber or two. You have selected a good title; it is really a *Companion*.

Respectfully yours,
S. W. DENTON.

Of course, we could not be expected to publish a magazine for fifty cents that would equal either of the above excellent publications, priced \$1.50 and \$3.00 respectively.—[EDITOR.

English Sparrows as Fruit Destroyers.

BY FALCON.

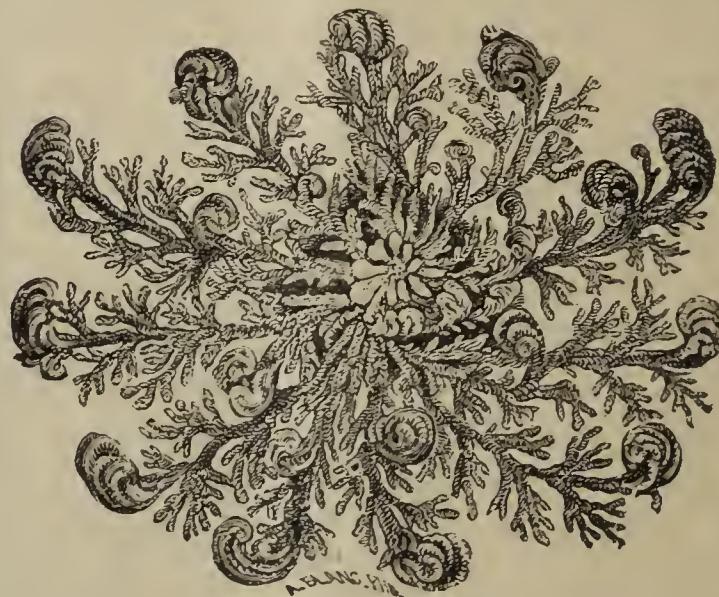
Recently while passing the grounds of a friend who had a number of fine grape vines of which he was quite proud, I noticed a group of English Sparrows, (*Passer domesticus*), in an arbor, chattering away and making a great noise about something. As I am always on the lookout for items against this sparrow, I stopped to observe their movements, and to my surprise, I saw one of them deliberately plunge its bill into the best grape in a large cluster of ripe ones; and not content with one, he pierced nearly every one in the cluster. The sparrow's object, I suppose, was to obtain the juice of the grape.

About a week later I again had occasion to pass that way, and behold! almost every bunch of grapes on the

vine was withered and good for nothing. Each grape was pierced with a small hole in the side, which told the story.

The Resurrection Plant.

This singular plant is really one of the wonders of creation. Imagine a bunch of withered looking, curled up shoots, brown, stiff, and apparently dead, resembling a bird's nest. Place it in water, in half an hour what a



transformation! The withered looking bunch has now opened and is transformed into a lovely patch of moss, entirely covering an ordinary plate. In its native habitat, when the dry season sets in, the plant curls up into a dry ball and is wafted away by winds from place to place, sometimes for hundreds of miles. When at last it reaches a moist place it gradually unfolds itself, makes new roots and thrives in its new found home. This sensitiveness to moisture is so great that even after the plant may seem dead, it will open and close as if it were alive.

Those desiring a specimen of the above plant should write Anna B. Nickels, Laredo, Texas.

Don't use too coarse shot when hunting for specimens. No. 10 will kill anything from a humble bee to an eagle.

Some Stories About Ants.

BY W. R. LIGHTON, CRESTON, IOWA.

Continued from last issue.

Another question which furnishes ground for debate, is whether the organs of vision are so far advanced as to suffice as such in the performance of ordinary duties of life, or whether it is not necessary for the ant to employ the power of scent, which it possesses so wonderfully developed, as a substitute.

Its underground habits would suggest this latter case to be true, as it would have comparatively little need of acute eyesight in its life in the interior of the hill, and scent, on the other hand, would come into most active service.

Francis Huber, the blind naturalist, was devoted to this idea, and some of his experiments were most satisfactory. One of these is very interesting and very simple, and can be tried by any one who cares to see a curious illustration of the correctness of Huber's belief. I have tried it many times and always with the same result.

Take a bit of sugar, or other substance of which the little fellows are fond, and place it upon a sheet of paper or clean shingle, near the nest, and if your ants are native born American citizens, it will not be many minutes before the sugar will be discovered, and after that it will be but a short time until the working population of the hill will be in battle array removing the store of sweets to within doors.

Now watch the procession closely and you will see that instead of each individual acting independently of its brothers in the work and choosing its

own pathway to and from the nest, all pass back and forth in regular columns, each ant following directly in the footsteps of the one which preceded it, and observing with surprising accuracy each variation to one side or the other.

If, as the first ant started to return, you take a pin-point and force the ant to take a very winding and devious course, that will make no apparent difference to those that follow—they will keep exactly in its foot-steps.

So, too, if you lift an ant up and place it upon the ground eighteen inches from the nest, it will not take a direct road back, as it would if it could see the nest, but will run wildly this way and that, until it strikes the trail of some of its fellow citizens who have passed that way, and will follow this pathway, by scent, till it reaches the nest.

It is believed that ants and bees and other insects, have the eyes sufficiently developed to be able to perceive light and even to distinguish colors, but not so as to distinguish objects one from another.

Other stories will have to be kept for another time, as this paper is stretched out far beyond the space I should have taken.

During the last two years, several Celtic tumulus in the district of Geinberg, in Upper Austria, have been opened and found to contain valuable relics of prehistoric times. Recently a similar tumulus was discovered at Mattighofen, in the same neighborhood and among its contents was found a diadem of pure gold richly carved in the well-known style of old Celtic art.

Young Naturalist's Journal.

Cryolite or Kryolith.

BY DR. B. F. MASON, SAN LEANDRO, CAL.

Cryoline, or Kryolith, is usually found in snow-white masses, although sometimes its color is brown, red, and even black. Its names are from the Greek words, *kruos*, ice, (to which its remarkable quality of melting in the flame of a candle alluded;) and *lithos*, a stone; hence its common name of ice-stone. It is a brittle, rather soft, sub-transparent, or translucent mineral, with a vitreous or pearly luster. Its composition, by a chemical analysis, is found to be: aluminum, 13; sodium, 32.8; fluorine, 54.2. It is distinguished by its fusibility in the flame of a candle, and then heated in an open tube, by its giving off hydrofluoric acid, which etches the glass. The water which condenses at the upper end of the tube, reacts for fluorine with Brazil-wood paper; while in the forceps it melts easily, coloring the flame yellow.

It is soluble in sulphuric acid with the evolution of hydrofluoric acid. On charcoal it fuses easily to a clear bead, which on cooling becomes opaque; after long blowing, the sodium is absorbed by the charcoal, a suffocating odor of chlorine is given off, and a crust of alumina remains, which if heated with a solution of cobalt, gives a blue color.

A number of years ago this mineral was only found in isolated pieces in the Ural Mountains, in Russia, and a specimen was worth its weight in silver, mostly for cabinet purposes.

In the year 1857, the Danish Government sent a scientific expedition to its ice-bound possessions for the purpose of gathering a collection of the clothing, weapons, utensils and fishing tackle

of the Esquimaux, for exhibition in the Danish Museum. When this collection arrived in Copenhagen, a scientist discovered that the fishing nets were weighted with rare stones. He examined them and found that they were the rare mineral, cryolite. An expedition was soon formed and a mine opened, but the first attempt to work the mineral failed, because chemistry had not yet succeeded in extracting the valuable properties of the mineral at a reasonable cost. But shortly after, Prof. Thompson made a discovery by which cryolite became of great value to many manufacturers.

The first company in the United States to appreciate the usefulness of cryolite was the Pennsylvania Salt Manufacturing Company, and they were wise enough to enter into a contract which gives them a perpetual monopoly in America, and an absolute control of three-fourths of all the cryolite mined in Greenland.

To show the importance of this mineral, there was imported and consumed in the United States, in the single year 1884, an amount worth one hundred and six thousand and twenty-nine dollars.

The mine is situated at Evigtok, in West Greenland, where it constitutes a large vein in-gneiss. The workings have now reached a depth of four hundred feet, and the cryolite taken out at that depth is of as good a quality as that found at the surface, and apparently of unlimited quantity. Work in the mine can only proceed in the spring months, after which the water of the ocean is allowed to flow into the mine. An ice crust ten to twelve feet thick soon forms, and protects the mine. When spring opens, an aperture is

made through the ice crust and the water pumped out of the mine. Were this precaution not taken, the mine would become thickly coated with ice and could not be worked at all.

The great demand for cryolite has given a strong impetus to the search for it in the United States, and in 1883 a mineral resembling cryolite was discovered at Pike's Peak, El Paso county, Colorado, and several samples of it were sent to the president of the Pennsylvania company. He pronounced them to be cryolite, though of an inferior quality, and immediately wrote to have a ton of the mineral sent to him, even though the cost should be \$5,000. The answer returned was that all the cryolite that could be found would not amount to a hundred pounds. This is the only locality in which the mineral has been discovered on this continent.

Cryolite, or kryolith, can be employed for a great variety of purposes, among which are the manufacture of lye, caustic sodas, aniline colors, porcelain hollow-wares, milk-white lamp globes, and also in the production of metallic aluminum.

About Cleaning Oily Specimens of Lepidoptera, etc.

If a specimen becomes oily, it is generally believed that its beauty can never again be restored; but with a trifling cost and a little labor any specimen will in a short time have again its former lustre, without injury to the insect. This remedy has been tried on the most tender Diurnals, as well as on Sphinges and Noctuids. It can be used on every insect. Should a specimen be oily throughout, body and

wings, it may be put in the following fluid: One part of sulphuric ether to two parts of the strongest alcohol, and left therein for about twenty-four hours. Should the specimen be very oily, another bath may have to be applied.

Should this second bath, after removing the insect, be only slightly discolored, the insect may be put in the last bath, which consists of pure sulphuric ether, in which it is left a few hours only. After being taken out and partly dried, it is put on the spreading-board.

Another way of cleaning specimens, where only the wings are oily, is this: The specimen is put on the spreading-board, under side up, without fastening it in any way, and the purest spirits of turpentine poured on to fully soak the wings, after which finely-powdered pipe clay is strewn thickly over the affected parts, and this left to dry. Should the clay, after being dry, be yellow, the oil is not all out of the wings, and the above has to be renewed. Should the clay be white after drying, it can be relied upon that every particle of the fatty matter is drawn out of the wings. To remove the clay need a little experience, though any one can do it with a little care. Hold your specimen on the upper part of the pin, and give the pin a little jerk near the point, and the clay, being brittle, will easily fall off. After it is all removed the specimen may be brushed off with a fine camel-hair brush until clean. A specimen treated in the above ways will never again become oily.—*Canadian Entomologist.*

In the Arctic region there are 762 kinds of flowers. Fifty of these are confined to the Arctic region.

A Battle of the Liliputians.

BY W. W. WESTGATE, HOUSTON, TEXAS.

I saw an article in the *COMPANION* a short time ago in relation to ants, that reminded me of something that occurred recently under my own observation.

While sitting at my desk one afternoon, I happened to turn my head and saw a long line of ants coming and going on the lower ledge of an open book case behind me. My naturalistic instincts were at once aroused and every thing dropped to watch the ants. I soon perceived that they were entirely different from any species that I was familiar with. They were black, about an eighth of an inch in length, had very long legs, and their antennæ were slender and long, terminating in a large knob. They would not bite; I caught several and held them in my hand, squeezed, pinched, and by every means in my power tried to induce them to bite, but all efforts were in vain. They seemed crazy, and ran all over my hand, waving their antennæ wildly in the air. All that passed in one direction went empty handed, but those returning the other way were loaded with dead ants. In one place an ant would go lugging along a dead one; in another place there would be three or four all tugging and burdened with another. Tracing them up, I found that they came from a large newspaper spread out on the bottom of the book case, and seemed to be engaged in fighting one of the battles of the age, and one of the severest insect fights, too, that I have ever witnessed. The newspaper was covered with dead, dieing and strug-

ging ants, all in a mass together. One ant would run up to another and they would regard each other for an instant, tapping their antennæ together, then rush at each other in a perfect fury; the fight thus commenced would last until one or the other was killed, and carried off in triumph by the victor. I could almost fancy that I heard their jaws snapping, and terrible imprecations belching forth. Again, in another place, one ant grabbed another by the leg and attempted to carry him off, whether he would or no; while a third would seize the first, and a fourth would tag on to the third, and so, whirling and rolling about, they had a "merry go around" of their own. My observations were suddenly brought to a close by a hand unexpectedly slapped down among them, stopping their fight and dispersing the combatants; the noise so startling them that they forgot their pugnacious intentions in their efforts to escape. So far as I could perceive, there was no difference between them; they seemed to be all of one kind. I subjected them to the microscope, but could not perceive the slightest variation. Will some brother naturalist name them from this meager description?

A few more contributions from our readers would be very acceptable. Come, friends, you can certainly find some interesting subject which to write upon; some of your experience in the field, or observations on some species new to you, would, undoubtedly, be very interesting. Write only on one side of the paper. By all contributing a few short articles now and then, it will make the paper more interesting.

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We request all of our readers to send us a description of their Collecting Excursions, their Finds, or any items they may think will be of interest to the readers of the COMPANION.

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RANDOM NOTES.

What has become of the *Hoosier Naturalist*? Wake up, Trouslot.

A sure sign of winter's approach is a visit from our little feathered friend, *Junco hyemalis*.

Now doth our feathered songsters bid us adieu and take wing to the sunny South. Wish the English sparrow would ditto.

Long winter evenings are approaching, friends, and you will want something to read. Take the COMPANION.

The publishers of the *Collector's Science Monthly* inform us that they will continue the publication of their paper immediately.

Mr. H. M. Downs, of Rutland, Vt., late publisher of *Tidings from Nature*, is now issuing a weekly publication known as *Science Series*. We wish him unbounded success.

How lonely the woods are now; the trees are foliageless; nearly all of the feathered tribe have left us; and the only sound that breaks the stillness is the rap of the woodpecker or the occasional chatter of the squirrel.

We wish to recommend to our readers Mr. J. M. Southwick, of Providence, R. I., whose advertisement appears in this issue. We have had considerable dealings with this gentleman, and have always found him prompt and reliable, and his goods are always of the best.

We have somewhat improved the appearance of this magazine since the last issue. We believe in improvements, and the faster the subscriptions arrive, the more the improvements. What other magazine has made a better record in one year than the COMPANION?

A great deal has lately been said concerning the preservation of our native birds. Various journals attribute their very rapid destruction to numerous causes, such as the taxidermist, the young egg collector, the hawk, the milliner, and a variety of other sources. We will express our opinion on this all important question at a later date. In the mean time we would like our readers to express their views on the subject.

Curiosities of Howe's Cave.

BY G. E. WELLS, AMES, N. Y.

Continued from last issue.

Here is a most remarkable stalagmite of many tons weight, the Tower of Babel, which blocks the path and reaches to a great height. The Elephant's Head and Indian Dugout are passed and we next come to Cataract Hill. What is this sound that comes from within? A heavy roar as if a mighty cataract had burst and was sweeping down upon us. The first impulse is to retreat, but our guide reassures us, and we press on, expecting to find some great cataract, but now the roar seems to come from beneath us, and as we proceed is lost entirely.

The next point of interest is Music Hall where musical tones appear to be never done echoing, but go dancing gaily about, returning again and again, filling the air with harmony. A low note produced here, echoes and re-echoes mysteriously through the silent chambers, completely filling the cavern with a weird vibration, unearthly and indescribable. A board on being raised and let fall with a slap upon the clayey path, sounds like a clap of near thunder, whose echoes roll and rumble frightfully. Just beyond we pass the Keel of Noah's Ark, and here the noise of a cataract increases to a thunderous sound. It must be a young Niagara, at least. Soon we come to it, and lo! a tiny waterfall four or five feet high, and perhaps a foot wide, at the outlet of a little lake. We now enter a narrow passage and soon arrive at the Rocky Mountains. These consist of huge masses of

rock and broken stalagnites, upon which we are obliged to climb. Here is Pike's Peak, a pure stalagmite forty feet high. The roof of the cavern at this point is lost in the darkness. We next come to the Valley of Jehosaphat, about a quarter of a mile in length, and probably a hundred feet high. A stream of clear, cold water, called the River Jordan, meanders along the whole length of this valley. The forms of stalactites seem to increase in beauty and interest the farther we go. Here is the Baby Elephant, Uncle Tom's Cabin, with Aunt Chloe's Bonnet, just as she left it, as natural as life. Now we come to the Yosemite Valley, a deep canon, along the edge of which we creep, fifty feet above the rushing stream. Overhead, for quite a distance are masses of rock, some of them weighing twenty or thirty tons, which seem to have dropped and caught between the walls.

Our course, which seems to have been nearly straight thus far, is suddenly blocked by a solid wall. As our time is limited, we take a passage that leads to the right, and soon find ourselves in the Winding Way, a long passage just wide enough for one to pass through. This passage is very crooked, forming a long series of S's, so that you can hardly see a person in it three feet ahead. This wonderful passage is said to be eighty rods long, and its walls are smooth as glass. At the end of this crooked passage is the Devil's Gateway,—rightly named, leading as it does opposite the Straight and Narrow way—and now we come to the Silent Chamber.

We have long since passed out of hearing of the cataract and the ripple of the little brook, and now no sound

reaches us from the outer world; a stillness as of the grave holds everything in silence, so profound that it seems to be crystallized.

"Now," quoth our guide, "let us blow out our lights." "But your matches—have you matches? We are three miles from daylight, and—Here are matches, and see, they are good;" and out went our lights. "Now listen and watch for five minutes." We listen in the silence that is really dead, and in the darkness is almost felt, watching two mysterious, luminous balls of light, which our guide tells us are always seen by persons who try this experiment, until the silence seems to creep up and around us like some medium dense as water. But here are our lights again, and on we go, passing first a stalagmite clear as crystal, named the Broken Column, then through Fat Man's Misery, a narrow passage about thirty feet in length, through which we are obliged to crawl, lying flat on our faces. A very fat person would have some misery to get through here. The last object of interest is soon reached, it is called the Rotunda, and is the greatest wonder of all, a circular room twenty-five feet in diameter, and which rises, our guide tells us, to a height of three hundred feet. "How do you know this hall to be three hundred feet high?" we inquired. "I'll tell you," he replied, "we have repeatedly fired rockets up into this space, and a rocket warranted to burst at three hundred feet just shows the upper end." We are told that we are four miles from the entrance. The sides of the cave show everywhere marks of the swift stream that once flowed through this passage, forming this wonderful cavern.

We would like to speak of many other objects of beauty encountered, but this article is already too lengthy. Bats are the only living thing found in the cave. The round trip occupies about three hour's time. The air is pure and invigorating. The whole is a wonderful creation and an interesting study as well for those who admire the beauties and curiosities of nature as for those who adore the great Author of the Universe and delight in contemplating his wondrous works.

THE END.

Audubon and the Snake.

A very amusing anecdote is told of Audubon, which occurred while on a collecting tour through the South some years ago. He and his friend were watching a woodpecker fly to and from a series of holes excavated in the trunk of an old tree. The bird at last stayed in the holes longer than usual, so Audubon concluded to climb the tree, and if possible, capture the bird by closing the openings of the holes. When he had reached the supposed hole, he was in the act of putting in his hand, when a large black snake poked his head out. At the moment he was so frightened that he let go all holds and fell headlong to the ground. His friend, seeing him fall, rushed to his assistance, and on inquiring if he was hurt (which accidentally he was not), received this answer: "No, I am not hurt, but if you want to see a frightened snake, just climb that tree and look into that hole."

Agents wanted to canvass for the *COMPANION* on liberal terms. Send a stamp for commission.

Owls Without Memory.

A naturalist in the West has concluded either that owl are devoid of memory or that they do not mind going about with owl-traps attached to their legs.

He set a trap to catch an owl, and it mysteriously disappeared. He then set a heavier trap, and caught in it an owl which had the first trap attached to one of its legs. The phrase, "stupid as an owl," seems a fitting reflection upon a bird which would set about making a collection of owl-traps in such a manner as this.—*H. L. Bragg.*

Quartz.

BY W. S. BEEKMAN, W. MEDFORD, MASS.

As several have shown quite an interest in the description of various quartz specimens, I give a little account of a few more varieties, and defer the description of the most beautiful metallic minerals I intended for this paper, for another mouth.

One of the most curious quartz specimens I have had the pleasure of possessing was a crystal from some foreign locality. The material was of an opaque, milky color, and the form was a perfect hexagonal pyramid, being a termination, the prism being wanted. It was a surprise to find that it separated into two perfect forms, and as the one underneath was hollow, I probably only had part of the entire crystal, and there may have been more sections on top. The two pyramids were of the same thickness, but of course the upper one was a trifle smaller than the lower. It seems that at regular intervals, during the process of growth, the

deposition of quartz was interrupted by the formation of a very thin layer of a micaceous clay, and then as the crystal continued to form, the layers of clay formed weak joints, as it acted as a lubricator and prevented adhesion. This capping of the quartz gives it the name that rightly describes it, **CAPPED QUARTZ**. Instances where the growth of a crystal stops and immediately continues again without the interference of foreign matter, is common, and crystals thus formed are known as phantoms. The dim outline of a termination inside of a clear crystal is a *phantom* in every sense of the word. At one locality in Canada, the phantoms are coated with a very bright red layer of some mineral, and makes very attractive specimens.

There is a locality in Maine that gives very curious phantoms. When the new crystal begins to form on the termination of an already finished one, instead of carrying out the symmetrical figure, it bulges out and forms a short, fat crystal on top of a long and slender one, that looks for all the world like a boy carrying a child astride of his shoulders.

I have before me a crystal that I would like to exhibit to all of the readers of this valuable magazine, if they could be collected into one large hall, and all have a pleasant time telling of their work. There is one objection to the crystal, in my eyes, that renders it more worthy of a mantle than to be placed in a cabinet, and that is, it has been cut and polished. I dislike such specimens among minerals. Of course in many cases polished specimens are required to bring out the beauty. The crystal I have reference to, is of Japanese origin, and was cut and polished by

a Jap, who made a rude effort to imitate its natural form of a crystal, but got eight sides instead of six. The crystal is of clearest water, about four inches long and two in diameter. It seems to be perfectly clear and pure, but a very rigid examination discloses that instead of being perfectly pure, it is completely filled with asbestos needles; there is not a quarter of an inch of pure quartz. The asbestos fibers are so transparent and fine that it is only in a certain direction they are visible. They reflect light at almost the same angles as that of the quartz, and are thus rendered nearly invisible.

In examining for the fibers, if one is a close observer, another quite wonderful thing will be discovered. There are in the crystal eleven perfect phantom terminations, and at the top seven more are close together. Taken as a whole, the crystal offers quite a study.

I have recently received from North Carolina two quartz crystals to dispose of for twenty-five dollars. They are of a very clear, smoky color, almost of a wine color. They weigh about eight pounds each, and contain hardly a flaw. Large crystals are generally cloudy at the base, but these are of a uniform clear tint throughout.

There are many more varieties than those above described, in fact I have one rose-tinted crystal in mind that cannot be described so as to present its beautiful appearance in a manner that would be readily understood by anyone. I shall endeavor to describe a very beautiful Japanese mineral in my next paper.

By a Japanese process seaweeds are made into paper so transparent that it may be substituted for window glass.

Interesting Facts About Mound Pipes.

BY E. A. BARBER, A. M., PHILADELPHIA, PA.



From some of the oldest artificial mounds in the United States a considerable number of tobacco-pipes, of a peculiar type, have been exhumed; consequently this form of pipe is believed to be the earliest made by the inhabitants of America. The general form is a broad, flat platform, slightly curved downwards, with a bowl rising from the centre. This style of pipe is complete in itself and does not require an additional stem, one end of the base serving for a handle and the other for a mouthpiece. These pipes occur with plain, spool-shaped bowls or are elaborately carved in imitation of birds and animals.

Nearly forty years ago the first discovery of such pipes was made near Chillicothe, Ohio, by Messrs. Squier and Davis, during their exploration and survey of ancient mounds in that State. From one earthwork they took nearly two hundred pipes, which are now deposited in the Blackmore Museum, at Salisbury, England. One of these, which is here figured (from Dr. Ran's "Archæological Collection of the U. S. National Museum"), is probably the finest example in existence. The bowel represents a human head and is most beautifully carved.

Next to this collection of mound pipes, the Davenport (Iowa) Academy of Natural Science possesses the largest series of such pipes in the world, which now numbers about sixty examples. A few years ago Mr. W. H. Pratt, one of the members of this Society, made inquiries as to how many other specimens were known in collections in the United States. He succeeded in finding, all told, only about a dozen specimens, but since then several others have come to light and there may now be as many as twenty on record.

Mr. A. E. Donglass, of New York city, has probably the finest private collection of pipes in the United States, which includes several specimens of this form. Amongst others he possesses a platform pipe with a bowl carved to resemble the head of a Rocky Mountain sheep, its peculiarity consisting in the fact that the head faces *away* from the smoker. This is the only specimen known which possesses this feature. In every other specimen thus far discovered the head of the animal, bird or human being faces *toward* the stem orifice. Platform, or curve-base pipes, as they are sometimes called, are the most valuable of all aboriginal pipes.

Metamorphosis of Arachnida.

BY "FRANCIS."

"Do spiders undergo metamorphosis?" If this question were asked of the ordinary observers of Nature, the answer would probably be purely a Yankee one. "Who ever saw a spider in the form of a grub, change into a pupa, and finally transform into a web-spinning insect?" Such a supposition

savours to a certain extent of absurdity. But as a matter of fact, many of the *Arachnida* do pass through the stages of larva, nymph, and perfect insect. In some genera the metamorphosis is very marked, and in a few species even further change is super-added.

Most of the *Arachnida* that do not undergo metamorphosis, shed their skins from time to time, and internal changes go on before and after these moultings, which are very considerable and important. Moult after moult produces fresh changes, and the appearance of new structures, so that finally the sum of all these alterations almost equals in amount those which the transforming spiders undergo. The non-transforming spiders, however, are hatched from the egg in a more perfect state of development. They are hatched with four good pairs of legs, while their relatives, that suffer metamorphosis, have only the rudiments of three pairs when they emerge from the ovum.

Most of our common spiders, so called, simply pass through several moultings, each time changing essentially their general structure, and each time gaining in strength and activity. Being hatched with only imperfectly developed limbs, and with only a limited amount of strength, they do not come to their full strength and vitality until their last moult has taken place.

The spiders which undergo transformation include the *Acarida* and the *Hydrachnidæ*, or water mites; those curious little spider-like insects that we see in such countless numbers on the surface of our pools. The eggs may easily be found by a careful examination of the surfaces of the rocks, in and near the water.

As soon as the larva are hatched they betake themselves to their feeding places; some of them eating the stems of water plants, and others preying as parasites upon the large water beetles, as the *Dysticus* and the *Nepidae*.

Fastening themselves securely to the side of their victim, there they stick and eat until ready to enter the nymph state. There is something remarkable about the growth of these larvae; the only part of them that grows at all is the abdomen, and that swells to such enormous proportions, that finally one would easily mistake their head and thorax, legs and all, for the head itself, so great is the contrast.

As soon as they are ready to begin the first transformation, they leave off eating and commence to shed their skin. The nymph, however, strange to say, still remains fixed to its victim, and still devours its flesh. And there it stays until the final change takes place, and then the perfect mite appears, ready to skip about with its fellows, on the water.

Although these members of the spider tribe do undergo metamorphosis, there is no other class of insects whose individual species show so great a variance in their mode of development.

Some, as we have seen, suffer metamorphosis, and some simply have a succession of moultings, and there are still others that apparently have no change whatever; and the history of the maturing of the ovo-viviparous *Arachnida* has yet to be written.

We would like the readers to assist us as much as possible by sending in contributions, exchange notices, correspondence, queries, etc., and take a general interest in the magazine, and we will show you an interesting journal

Californian and Polynesian Fish-Hooks.

In his work on pre-historic fishing in Europe and North America, Dr. Rau has drawn attention to the similarity of South Californian and Polynesian fish-hooks of shell and bone, and has figured a few from South Sea Islands for the sake of comparison. In consequence thereof, he received, a short time ago, from the ethnological department of the British Museum, a communication, together with a large plate of drawings of Polynesian fish-hooks preserved in the museum. Some of these are strikingly like the Californian specimens; not only does the curved points in these hooks approach very closely the shank, but they also show, like the Californian hooks, a barb on the outside. This analogy is the most significant, as some ethnologists have claimed a relationship between the Polynesians and South Californians.—*American Naturalist.*

One of the most obliging professional scientific gentlemen is Prof. D. G. Brinton, of world renown fame. He is ever willing to assist a young student.

We are pleased to learn that our friend and contributor, Mr. W. S. Beekman, who has recently been very ill, is recovering.

Few, of what a year ago were numerous, papers to-day devote any space to archæological news. We promised to, and intend to do so.

Pecan Point, in Arkansas, is one of the best fields for the potterist that the archæologist may wish to search. Many valuable finds have been made there recently.

CORRESPONDENCE.

Allow me to say that my "ad" in your magazine has paid me the best of any similar one I ever inserted in any publication. I had about three or four thousand specimens for sale and exchange, and have got rid of almost all so soon. Respectfully,

G. F. WHITTEMORE, Fitchburg, Mass.

DEAR SIR:—Thinking that the following might be of interest to yourself, your readers and advertisers, we concluded to write you.

We wish to **WARN** all collectors, dealers and every one against **ASHLEY W. KYES**, of Merrill, Wisc. Send no goods to him unless you have the **READY** cash from him, and then be careful. Although our loss is small, yet if he would break his contract for a small sum he would for \$100 or more if he had the chance. We will inform anyone of the particulars if they wish. We affirm that said Kyes has defrauded us of money righteously due us, and in declaration of same affix our names and title.

CHAS. H. DICKINSON, } of DICKINSON
EDW'D L. DURKEE, } & DURKEE,
Oct. 25, 1886. Sharon, Wisc.

Some time last April I found a nest of the Red-tailed Hawk placed in the top of a beech tree; about fifty feet from the ground. Seeing the female hawk fly off the nest, I at once began to ascend the tree. Reaching the nest, I peered over the edge and saw one egg of an ashy-white color with a few blotches of reddish-brown at the larger end. Not taking the egg this time, but awaiting a week later, and scrambling up the tree again, I saw another egg of a dirty white color, mottled over the entire surface with light reddish-brown dots. The nest was a bulky affair composed of sticks and lined with feathers, rope, rags, grass, and a variety of other indescribable material. I took the eggs and descended the tree. While going toward home I found a nest of the Cooper Hawk containing three eggs of a dirty white color, with blotches and dots of a dull ashy-brown. A. B. ROBERTS, Weymouth, Ohio.

EXCHANGES.

THIS column is open to all subscribers, who may insert exchanges free of charge. NO advertisements admitted to this column under any circumstances, and we shall reserve the right to insert no exchanges which are merely intended to secure cash purchasers...Ed.

G. D. STORY, Carterville, Mo.—Fine large mineral specimens to exchange for minerals, fossils, petrifications and curiosities.

FRANK HARRIS, La Crescent, Minn.—Fine English beagle dogs and puppies, for natural history books or birds' eggs. Send lists or make offers.

MRS. W. S. HAMMARD, Carthage, N. Y.—I have a choice variety of greenhouse plants which I will exchange for blooming bulbs of autumn blooming lillies and dentzias. A generous exchange given.

W. G. TALMADGE, 37 Garden St., Hartford, Conn.—A 5 drawed, black walnut cabinet, valued at \$3.00; double blade ash canoe paddle, 7 foot, value \$1.50; 85 best blue paper boxes, value 75c.; Vol. I Young Oologist and Vol. I Tidings from Nature, neatly bound, value \$1.00, to exchange for advertising space in any paper of 500 or more guaranteed circulation.

QUERIES AND ANSWERS.

Mrs. L. W.—Will some one please describe the color of the eyes of the barred owl.

We have a number of specimens sent us for identification, and being unable to identify them, we have sent them to several specialists and will endeavor to give our readers the names of their specimens in the next issue.

We will send this magazine for one year and a copy of Davie's Egg Check List and Key to Nests and Eggs of N. A. Birds, for \$1.25. The regular price of the book alone is \$1.00. This Check List is finely illustrated with seven full page engravings, and contains about 200 pages.

George F. Guelf,

BROCKPORT. N. Y.

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WILL H. PLANK,

Editor and Publisher.

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Vol. II.

November, 1886.

No. 4.



THE

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EDITED AND PUBLISHED BY

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VOL. II. BROCKPORT, N. Y., NOVEMBER, 1886. NO. 4.

The Zoologist's Wooing.

When first I saw you, Eland deer.
My Hart it did repine,
Because I Gnu how good you were,
And wished that you Ermine.

When I your Tapir fingers dressed,
Upon that eve in May,
The glance you gave me Seal-ed my fate,
And I'm still yours to-day.

I'll never break Ape art the Lynx
That bind my Hart to thine,
Till I shall Lion my last couch
And in my grave recline.

Gaze, Eland deer, upon me now!
(That's Civet pleases you),
One glance from your bright eyes will light
This Mole-dering fire a-Gnu.

And if it is for Porcupine,
Though it should ruin me,
I'll bring as many Hamster you
As one could wish to see.

But then, of course, weak Antelope,
For that would be a Boar.
But we can stay right here Rat home.
And I'll never leave you Mohr.

—Hoosier Naturalist.

EVOLUTION;
ITS PHASES, THEORIES AND RELATION TO
RELIGION AND MODERN SCIENCE.

BY "FRANCIS."

JTRY to evade it as we will, do our best to escape the discussion, there is one question that must sooner or later be met, and that question is as regards the theory of Evolution.

Ever since science first began to reveal itself there has been a long andbit-

ter struggle between it and the Bible; and now, although all the ancient points of dispute have been settled, and although it has been proved to the entire satisfaction of both scientists and theologians that science has thus far fully corroborated the Bible, yet in this struggle with this comparatively recent theory, the old warfare has been renewed with increased vigor. Ministers, even, will stand up in their pulpits and preach Evolution at the expense of the Bible; nay, some even go so far as to renounce the Bible entirely, so blinded and infatuated have they become with their new hypothesis.

With a foe like this, and this apparently is a foe, it is indeed time that churches should be waking up to the danger that threatens them, and in truth they are. But let us see if this theory is as much of an enemy to religion as it appears. If it is, then young scientists are placed in a very dangerous situation; they cannot help seeing and hearing more or less of this controversy, and if they are to be taught that one must be true to the exclusion of the other, then it is very obvious that the Bible is in great danger of being overthrown, with an adversary as powerful as science.

But science is by no means an adversary of the Bible and religion; quite the contrary, the two should go hand in hand, and I am going to make a very bold statement, and am prepared to

take the consequence. I say that had it not been for the narrow-mindedness of those who have been from the first the antagonists in this question, well educated and rich in scientific and theological research as they have been, I say had it not been for their narrowness of views, the Bible need not have entered into the controversy at all. But now that it has become involved, and its truth and authenticity are at stake, the question must be impartially and thoroughly discussed. To accuse those scientists and boasted "free thinkers," who have forwarded this theory, of narrow-mindedness, may seem a little bold and unwarranted; and on the other hand, to accuse such men as Agassiz and those who have opposed the theory, of the same thing seems equally unwarranted; but however great and able they may have been in other lines, has not their course in this direction justified the accusation? We will except, perhaps, from them the name of Agassiz, for it is evident that he drew his conclusions from purely scientific reasoning, but it is a very significant fact that twenty-eight of the thirty-two reasons he urged as opposed to Evolution are now used as arguments *in favor of* that very theory. As soon as sufficient proof was found to warrant the acceptance of the theory, these scientists did so, and then fearlessly came forward and charged the Bible with being a lie; and why? Just because, in their haste, they have looked only at one side of the question. And also the ministers who have opposed the theory; at first thought the hypothesis that there is a system of evolution extending through the animated kingdom seems in open opposition to the belief that each successive

organisms is a separate creation; and these men have not stopped to give the matter a second thought. How foolish their hasty conclusion would seem to them if they would stop and consider it.

Why, look back over the history of science, and how many times has this same hostility and antagonism manifested itself, and how many times have the two opposing versions of the same story been proved to be wholly reconciled and concident. Take for example the story of creation, or of the deluge, as revealed by science and the Bible. It was the same thing, the same controversy, that is now being waged between Evolution and the Bible. Just as long as scientists argued upon one ground, and clergymen upon another; just as long as scientists said that the nebular hypothesis was true, and clergymen said it was false because in opposition to the Bible; just so long the warfare was bitterly and fiercely waged. But as soon as the two parties became willing to relinquish their hostility, and argue on a common ground, the clouds of doubt began to disperse and finally disappeared altogether. It is true that science tells us that the sun was the first in the order of creation, and the Bible says the earth was created first, and the opposition here is apparently more strong than in the case of Evolution. But the Bible, we must remember, was written in popular language, and just as soon as theologists were willing to do the most consistent thing in the world, to take the *earth* as the center of observation, then the two stories agreed in the most minute particular.

And isn't it a very significant fact that out of every such controversy, in the end the Bible has come off victori-

ous, with its truth only strengthened and corroborated by the attack?

It was so in the story of the deluge; it was so in the many historical disputes; it has been so in every attempt to overthrow it; and it will be so in this last antagonism with Evolution.

As long as one party stands on one cliff and the other party stands on the opposite cliff, with an impassable ravine between them, the settlement cannot come; but just as soon as they can agree to come together on the same ground the clouds will again disappear, and the unity of Science and the Bible be made all the stronger and more apparent.

Next month we will attempt to show that the question may be argued and settled on a purely scientific basis, and with no fear of even an insinuation against the Bible.

A Letter from Texas.

On October 27th I caught a Burrowing Owl, (*Speotyto cunicularia hypogaea*), alive, and kept him two weeks or more, when he died. He had a hole at the roots of a mesquite tree, in which he dived when he saw me. When I got him out he made a horrible noise, like nothing else that I know of, and cracked his bill, which with a hiss, were the only sounds he made. His dinner consisted mostly of raw beef. The place where I found him was about two miles south of the city, where the mesquite bushes grow about fifteen feet high and twenty feet apart. It is a favorite breeding place for Bell's Vireo, Orchard Oriole, Scissor-tailed Flycatcher, Black-throated Bunting, Lark Finch and the Mocking-bird, all of which are very abundant. I saw my

first Robin on the 1st, and on the 19th of the month I saw a Road-runner, (*Geococcyz californianus*). This is the first one that I have seen here, although they are plentiful around Austin, where I resided until two years ago. They generally build in oak trees, ten to twenty feet from the ground, and make a rather flat nest composed of twigs and roots and lined with cow dung. The eggs, four to seven in number, are pure white, though generally somewhat dirty. A friend of mine got a young Road-runner, which he tamed, and it would follow him everywhere. It would eat anything, and had learned to catch mice, lizards, etc. A boy impaled an insect on a pin and held it to the Road-runner to see what it would do, and before he could prevent it, it swallowed the insect, pin and all.

CLAS. D. OLDRIDGE,
Nov. 23, 1886. Waco, Texas.

Mr. W. S. Beekman, West Medford, Mass., has favored us with a sample of the Persian mineral lapis lazule. Upon being wet it attains a very rich beautiful blue color.

We are sorry to inform our readers that our friend and associate editor, Mr. Harry F. Thompson, of Indianapolis, Indiana, has severed his connection with the *COMPANION*, he being too much pressed with other work to devote the necessary time to the magazine. While on our staff he has proven himself both competent and obliging, and has filled the position entrusted to him in a very creditable and satisfactory manner. We hope that his duties in life will not be so confining as not to enable him to devote at least a portion of his time to science.

Amber.

BY DR. B. F. MASON, SAN LEANDRO, CAL.

Amber is found in irregular masses with a resinous lustre, without cleavage, and of a yellow, brown, red or even white color. Its hardness is between 2 and 2-5, and its specific gravity from 1.066 to 1.081. It is transparent to translucent, and when scratched with a knife leaves a white streak. It becomes electric on friction and fuses at 287 centigrade. It is a fossil, indurated resin, or gum, of vegetable origin, which has undergone some change while inhumed, due partly to acids of sulphur, probably proceeding from the decomposition of iron pyrites. It is usually found in beds of lignite, in alluvial soil on or near the sea coast.

Its composition is found to be by analysis:

Carbon,	78.94.
Hydrogen,	10.53.
Oxygen,	10.53.

True amber is distinguished from the imitations by its becoming electrical when rubbed, by its usual yellowish-green color and toughness—it can be cut into many forms—also by its burning with a yellow flame, and emitting a peculiar odor. This peculiar odor and the white streak which is left when scratched, are very characteristic of amber.

Amber was called *elektron* by the Greeks, from its so readily becoming electric when rubbed, and thus it gave the name electricity to science. It was named by some of the ancients *lycurium*, though this name was applied by Theophrustus also to gircon and tourmaline, minerals of remarkable electrical properties. The ancient Greek philosophers, who noticed amber's pec-

uliar electrical powers when subject to friction, held the strange belief that it was endowed with a soul. In Arabia for ages it has been considered a talisman against the evil eye, and in other countries a string of amber beads worn about the neck, has long been considered as a protection against inflammation of the throat on account of their warmth to the skin, and their maintenance of a constant circle of electricity. All the ancient writers speak of amber as a precious gem. The earliest Etruscan jewelry consisted of carved amber, which was called lynx stone, it was supposed to have some relation to the lynx. It is said that on one occasion Nero had the amphitheater adorned with amber. One of the largest masses of amber in the world is in the Royal Museum at Berlin, and weighs eighteen pounds. Another in the kingdom of Ava, India, is a little larger than an orange and weighs two and a half pounds. Still another mass, weighing twelve pounds, is owned by a Dantzie, who values it at three thousand dollars.

The greatest quantity and finest quality of amber is found in the Baltic sea, also in the sand on its shores, particularly after a storm, whose violence has washed it up from the deep. This amber often contains insects, and is highly prized as a curiosity. Often the insects appear to have struggled to escape after having been entangled in the soft gum, for occasionally a leg or wing is found some distance from the body.

Amber is mined from the mountains of Prussia; it is found on the coast of Denmark and Sweden; in Galicia, near Lemberg and at Miszan; in Poland; in Moravia, at Boskowitz; in Russia; in

Norway; in Switzerland, and in France, near Paris, in clay. In England it has been discovered near London, and on the coasts of Norfolk, Essex and Suffolk. On the American continent it has been found in Mexico, and in the United States, at Gay Head, at Camden and in New Jersey. To the geologist there is a peculiar charm about the "golden gum," for it carries him back to the ages when there were primeval forests where man's foot never trod. It tells him that under the stormy Baltic and beyond the marshy coast lines of Northern Europe were once titanic woods, abounding with resinous pines and firs, somewhat resembling those of our own age; and that thousands upon thousands of ages ago these pines exuded from their limbs and trunks masses of half-liquid gums, clinging in ball to their rough barks, and that these odorous gums attracted numerous insects and even small reptiles, and that many of them gradually became embedded in the viscid gum. Ages upon ages swept down the vale of time, the amber-bearing pines and firs grew old, perished and decayed where they fell, leaving the exuded gum to harden, and to finally become altered by fossilization under the deposits of succeeding ages until it lay many feet beneath the accumulated debris. Then the coast gradually sank and the sea swept over the dead forest, and thus it is that amber is found both under the land and beneath the sea.

And from the insects and small reptiles perfectly preserved and buried in their "crystal coffins," the geologist is enabled to tell that some of the flies, bugs and small lizards of that primeval forest resemble those of our own age.

Amber is employed for a great variety of purposes. It is the basis of an excellent transparent varnish; it affords by distillation oil of amber and also succinic acid; and as the preparation of the amber varnish required that the amber be fused, all these products are obtained at the same time. Small pieces and scraps of amber are pulverized and burned as an incense in certain churches. The use of amber for the mouthpieces of pipes and cigar-holders originated in the East, where the pipe, like the calumet of the American Indians, is a special institution. The chibouque was passed from one to another, and as the amber was supposed to be prophylactic, or proof against poison, no fear of treachery existed, as it was supposed to be impossible to convey poison by this substance. It is undoubtedly owing to its perfect cleanliness and non-absorptive property that makes it grow more in favor with smokers each year. There is a difference of opinion as to which variety of amber makes the finest mouthpieces. In America the clear amber is considered the most valuable, while in Europe the cloudy material commands the highest price.

Coleoptera Found in Fungi at Peekskill, N. Y.

BY J. D. SHERMAN, JR., PEEKSKILL, N. Y.

Cercyon praetextatum, SAY.—One specimen, August 28th.

Silpha americana, LINN.—One specimen, August 17th.

Listotrophus cingulatus, GRAY.—Occasionally found.

Philonthus cyanipennis, FABR.—Very common: August.

Tachinas memnonius, Grav.—Common latter part of August.

Boletobius cinctus, Grav.—Very common latter part of August.

Oxyporus vittatus, Grav.—Very common: August.

Tritoma humeralis, Fabr.—Common in 1884; none seen since.

Tritoma unicolor, Say.—Moderately common: August.

Hister foedatus, Leconte.—Common: August.

Epuraea rufa, Say.—Very common: August.

Pocadius helvolus, Er.—Common: August 19th.

Cryptarcha strigata, Fabr.—A few: September 1st.

Onthophagus hecate, Panz.—Common: July and August.

Ataenius stercorator, Fabr.—Common: September 1st.

Geotrupes splendidus, Fabr.—Sexes found at bottom of a winding hole communicating with the interior of the stem, and some three or four inches deep. With them was also found a pupa of the newly transformed male, which was .66 of an inch long, and white, with several short hairs.

Geotrupes, Sp. (?).—One, of a blue-black color, August 26.

Hoplocephala bicornis, Oliv.—Common under fungi growing on trees in May and June.

Platydema excavatum, Say.—Common in fungi under the bark of dead pitch pine trees in March.

Platydema ellipticum, Fabr.—As preceding.

Tetratoma (?), Sp. (?).—A jet black species, much resembling a *Mordellid*. August 17th.

Now is the proper time to send in your subscription.

Shall We Collect Sets?

The following, in reply to Mr. Selover's article, "The Oological Collector," in No. 1, Vol. II, of the COMPANION, we clip from the last issue of the *Oologist*:

As the last numbers of the *Oologist* and also of the NATURALISTS' COMPANION have contained articles in which the writers make it appear that all those who collect single eggs do so, not from a love of study, but from the desire to "show off," allow me to say a few words of defense through your valuable paper.

There may be advantages gained by collecting in sets, it is true, but I think that many oologists will stand by me when I say that as much can be learned from a collection of single eggs, properly kept, as there can from a collection composed of sets. The way I do is to take the egg and fill out a data blank the same as if I had taken the set. An egg register may also be kept, but if the data blank is properly kept there is no need for the register. In this way one can learn as much from a single egg as he can from a set, and is thus saved the additional trouble required to obtain the set.

Collecting single eggs has the advantage of being the more humane way, notwithstanding what Mr. Selover says to the contrary in the last number of the NATURALISTS' COMPANION. As oologists are generally accompanied by one or two of their friends on collecting trips, it will be seen that one nest of eggs would often satisfy all if they collected single eggs, while two or three nests would have to be robbed if they collected in sets. It is bad enough that the birds should suffer at all, and if we can learn as much from a single

egg as we can from a set, let us by all means collect single eggs.

Those who collect eggs simply as curiosities would do mankind and the birds a favor by turning their attention to stamps, tags or something else that would cause no suffering to any kind of harmless or beneficial creatures. If such persons cannot be made to desist by gentle means, laws should be enacted by which they can be punished.

As I am, in all senses of the word, a "young oologist," I should be pleased to know if there are any of the older ones who endorse my plans. If so, let us hear from them through the *Oologist*.

Yours fraternally,

F. M. PATTERSON,
Fort Madison, Ia.

The Proper Sizes of Shot.

BY FRED C. LUSK, HOLLEY, N. Y.

Seeing your warning in the last *COMPANION*, "Don't use too coarse shot," led me to write this, thinking it would be of interest to some of your many readers. I use for all specimens from the little hummer up to the size of the waxwing, dust shot, that is, No. 16, using three drams powder, and one half ounce shot. In using this size, it being so small, the wound closes and but little, if any, blood flows, and consequently you have a clean bird to work on. How often it is that we have birds brought to us to be mounted that are so badly damaged by shot, that it is twice the work it ought to be for the price we get for doing it.

Right here I will tell other collectors my experience with bird's after being shot, that is, how to carry them safely, cleanly and separately. I use tin cones of different sizes, being left a lit-

tle open at the bottom, and drop the bird head down into it. I use no cotton in the throat, the small hole at the point of the cone lets out any blood or juices from the stomach, and the cone also keeps all feathers straight and smooth, which is a great help, as all taxidermists know. This is my plan, and I would be pleased to hear from other collectors as to their methods, through this magazine.

An Archaeologist's Discovery.

Halbherr, the archaeologist, who is at work in Crete for the Italian government, has found a number of votive offerings in bronze and clay in a cavern which is called after Jupiter, because he is supposed to have been born therein. Remains of half-burned ox and goat horns, bronze knives, and arrowheads indicate that there was some sort of worship on the spot. There is an outer and an inner cavern with stalactites, stalagmites and a beautiful little river.

Eggs of the Summer Redbird in a Mockingbird's Nest.

BY W. W. WESTGATE, HOUSTON, TEXAS.

Some time ago, while out collecting, I saw a male Summer Redbird in a tree near by. Experience had taught me that during the breeding season they never strayed far from their nests, so I at once started to find the nest. It was a long, tiresome undertaking, but the bird was an available monitor that every time told me when going wrong; when I went in one direction the bird ceased its crys, but when I turned, it commenced with renewed force. At last, after a hunt of about half an hour, I found the nest, some fifty yards

from where I had first seen the bird. It was on a horizontal limb of a small oak, about ten feet from the ground. The female was on the nest, but as soon as I reached the tree she flew off and joined the male in begging me to leave their treasures alone. Hardening my heart, like Pharaoh of old, I went on, and saw that the nest was precisely like that of the Mockingbird. This surprised me very much, for all the nests of the Redbird that I have ever seen were small, and composed almost entirely of grass. On reaching the nest it was plain to see that it was formerly the home of a pair of Mockingbirds, because it was lined with grass roots, which is an infallible characteristic of its nest. The nest contained six eggs, three of the Redbird and three of the Mockingbird. I only took one (I do not endorse the habit of collecting "sets") and left. It was very much incubated, but I succeeded in blowing it, and now have it in my cabinet. My supposition is that the nest of the Redbird was destroyed, and the female, being compelled to lay, took the first nest she happened to come across.

The Killdeer Plover.

(*Oxyechus vociferus*).

BY ERNEST GAMBLE, TECUMSEH, MICH.

The Killdeer is so called on account of its cry, which resembles the word killdeer. This bird is about ten inches long; extent of wings, twenty inches; bill $\frac{3}{4}$ inches long. The head is quite small; neck short; body rather slender; wings reaching to the end of the tail; feet long and slender. The bill is

black, and the feet grayish-blue. There is a black ring around the neck and a wide band of the same color on the breast.

The bird is common throughout the United States, being most abundant inland. They go South in September, and return quite early in the spring. I have read that the small flocks, when feeding, always post a sentinel to warn them of danger, but I cannot vouch for the truth of this, as I have never been able to see it myself.

Their chief resorts are new-plowed fields, the banks of rivers, and around marshy places. They feed chiefly on worms, grasshoppers and beetles. Their flight is strong and rapid, and their speed at running is very great. When undisturbed, they run along the ground and utter a murmuring note; but when frightened, they take wing and have a shrill, harsh cry.

They begin to build about the first of May, and rear two broods in a season. I have found fresh eggs on the 5th of May, and the latest set taken was on the 8th of July. Their nests are very simple, being only a hollow in the ground, about the size of one's hand, filled with fine chips or pieces of bark. The eggs are four in number, of a dark clay color thickly spotted with varying shades of brown and black. From about twenty specimens before me, I find the average dimensions to be 1.54 inches long by 1.12 broad. The nest and eggs are so near the color of the ground that they are very hard to find, and I have walked over a nest several times before finding it. A good way to find a nest is to go into a ploughed field and suddenly fire a gun, when the bird will often fly directly from the nest.

THE NATURALISTS.



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We request all of our readers to send us a description of their
Collecting Excursions, their Finds, or any items they may think
will be of interest to the readers of the COMPANION.

CHARLES P. GUELFS,
EDITOR AND PUBLISHER.

Brockport, New York, U. S. A.

Office of Publication, Ward's Block,
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RANDOM NOTES.

Lennie Henry, Bonaparte, Ia., has
our sincere thanks for some fine speci-
mens of quartz geodes.

John Carmichael, publisher of the
Agents' Directory, has removed from
St. Raymond, Quebec, to North Bay,
Ontario.

We would be greatly pleased if those
of our readers who are interested in
archaeology would contribute articles
on that subject.

The *Naturalists' World*, of Ilkley,
England, has just completed its third
volume. May it still continue onward
in the great and good work it is doing,
is the sincere wish of the Editor.

We wish to thank our readers for
the large number of contributions re-
cently forwarded. We hope they will
still continue to contribute, and thus
add greatly to the interest of the mag-
azine.

We would respectfully call attention
to the advertisement of Mr. Frank B.
Webster, on another page, and would
recommend him to our readers as be-
ing both prompt and reliable. His
goods are strictly first-class, and are
sure to give satisfaction.

We have recently obtained from Mr.
Frank Harris, of La Crescent, Minn.,
a fine English beagle dog, and would
cheerfully recommend all those in
want of a good hunting dog to him, as
he has a supply of the best dogs in
the country.

Mr. H. M. Downs informs us that
on the evening of Dec. 17th, Rev. Geo.
W. Perry, of Rutland, Vt., succeeded
in throwing the light from a stereopti-
can on a screen through several plates
of dendritic mica with beautiful effects,
showing plainly and in the natural
colors the intricate markings between
the laminations caused by water, hold-
ing various mineral substances in so-
lution, working its way between them.
Pictures of various leaves and ferns
were also shown, which were themselves
exposed on the sensitive plates in mak-
ing the slides, instead of photographing
them. Every rib and fibre were
clearly delineated with wonderful dis-
tinctness.

• Fusibility of Cryolite.

A somewhat lengthy article on cryolite in last issue leads me to suspect its writer, Dr. Mason, is more acquainted with it as its character is described by authorities, than by personal practical work. I would like to ask if any one has ever suspected its fusibility is at a lower temperature when placed in the scale of fusibility than when placed in a candle's flame?

It has been my experience, since *Random Notes* noticed the fact, to be disappointed in its fusibility. I would like to offer a fine mineral as compensation for the best essay on the causes of variance in the fusibility of cryolite, if there are any, to any reader willing to experiment. W. S. BEEKMAN,

West Medford, Mass.

Birds of Green County, Pennsylvania.

BY J. W. JACOBS, WAYNESBURG, PA.

I do not claim that this is complete, as there are from twenty-five to thirty-five unidentified species, including the warblers, vireos, creepers, sparrows, birds of prey, etc.

1.—*Hylocichla mustelina*, Wood Thrush. Common in swampy or damp woods. Breeds. Arrives about the middle of April; departs in October.

2.—*Hylocichla fuscescens*, Wilson's Thrush. Summer resident; breeds. Arrives last of April; departs in September.

7.—*Merula migratory*, American Robin. Very abundant summer resident; breeds. Arrives in March; departs in November. A number remain here throughout the winter.

11.—*Mimus polyglottus*, Mockingbird. Seen and heard occasionally; never breeds here.

12.—*Galeoscoptes carolinensis*, Catbird. Very common summer resident; breeds. Arrives first of May; departs in October.

13.—*Harporrynchus rufus*, Brown Thrasher. Common summer resident; breeds. Arrives in April; departs in September.

22.—*Scalia Sialis*, Bluebird. Abundant; breeds. Arrives in March; departs in November. A few remain during the winter.

27.—*Polioptila caerulea*, Blue-gray Gnatcatcher. Common summer resident; breeds. Arrives early in April; departs the first of September.

TO BE CONTINUED.

CORRESPONDENCE.

While loading freight at the Nickel Plate depot yesterday (Nov. 9th.), I noticed English Sparrows flitting about my head, with strings in their beaks. I sat down and watched them a moment and found they were repairing a Pewee's nest over the freight house door. Do they breed at all seasons of the year? There is snow six inches deep here, so I thought this was a rare occurrence. M. R. PORTER,

West Springfield, Penn.

—o—

As I have received many inquiries as to the description of coal fossils found in this vicinity, I take the opportunity of answering through the columns of your magazine. The fossils are found on the rock banks surrounding the town. They are found in masses of shale weighing from twenty-five to fifty pounds, which may be split open and both the impression and the

petrified fern may be seen. I have in my possession many species of ferns, also a few insects and two varieties of flowers shaped like a daisy: I also have specimens of the woods *Lepidodendra* and *Sigillaria*. I am going on an expedition to a new mine in a few days and if I find any more varieties I will let you know.

D. M. GROSH,
Shamokin, Penn.

—o—

I see you desire the readers of the *COMPANION* to express their views on the destruction of our birds. I think the main cause is the killing of birds for use on hats; but of course the taxidermist and the egg collector aid, though I do not wish to say anything against legitimate work. As local secretary, however, I shall do all in my power to aid the movement.

W. W. WESTGATE, Houston, Tex.

—o—

We clip this from a letter recently received from a subscriber:

"You might mention in your paper that I saw a Belted Kingfisher this day (Dec. 24th) flying south. I never noticed one so late in the season before. Where could this bird have been during the last cold snap of three weeks, when the ground has been covered with snow to the depth of several inches and the ponds, lakes and rivers are frozen over ?

S. W. DENTON, Wellesley, Mass."

—o—

In April '86 I constructed a box and erected it on a post for the Bluebirds. In about five days a pair of the birds took possession and commenced to build. From this nest I took three sets of four eggs each, and one of five. Everytime I robbed it they would put a new lining in the nest and lay another

set. I did intend to take every set the old birds laid to see how long they would continue rebuilding the nest, until she had laid the fifth set, when I concluded that it was time the birds should rear a brood.

This is the 19th of November, as "cold as blazes," and still there lingers plenty of Robins, Meadow Larks, Chipping Sparrows, Mourning Doves, Black-birds and Song Sparrows.

J. W. JACOBS, Waynesburg, Pa.

—o—

We clip the following from a letter recently received from the secretary of Chapter 847A of the Agassiz Association:

WASHINGTON, IND., Nov. 25th, 1886.

Dear Sir:—

"Chapter 847A is in a prosperous condition, with every prospects for further success. At present writing we have had our collections catalogued, and are steadily increasing in membership. So far, I have never come across a better paper, both in matter and typographical appearance, for the price, than the *COMPANION*. May your paper continue to remain as interesting, is my wish. We are especially interested in chemistry, and I have been slightly disappointed at finding no articles on that subject in your magazine. Hope you may succeed in obtaining something in that way; shall consider it my duty to supply the deficiency if you don't. BEN. W. CLAWSON.

ERRATA.

In the article on Cryolite on page 38 in No. 3, it reads "a suffocating odor of chlorine is given off." It should have read fluorine instead of chlorine.



Cacti.

Cacti have much to recommend them to the lovers of the curious and the beautiful, the majority possess very valuable character—*i. e.*, they are easily grown, so easily in fact that anyone who can only devote a small space to them in his window may grow them successfully. In the dry and heated atmosphere of a room which is so trying to most plants they are perfectly at home, and their demands upon the attention of their host are so slight that they may be left for weeks, nay, months, without the smallest supply of water. Few people have an opportunity to see a collection containing most of the best varieties. It is by contrast with each other that they can best be displayed to advantage. To a lover of Cacti there is a real fascination in admiring the beautifully colored spines of many of the Echinocacti as well as of the Mamillarias. The blooming of *Cereus grandiflorus* is certainly a sight worth seeing. Some of the Mamillarias seldom grow more than a few inches in height, while many *Cereus* are found in their native haunts measuring upwards of fifty feet high. Many of the flowers possess a powerful and most pleasing fragrance. They vary much in size as well as in colors. Some of the *Cereus* will often produce flowers measuring twenty inches across. When the brilliantly colored rose, crimson, purple or yellow flowers are seen, the observer is literally charmed with them. The fruit, or seed pods, are very ornamental and in some cases are edible. That of *Echinocactus visnaga* is used as a lemon and a pleasant beverage is made of it. The seed pod of *E. simpsoni* is agreeable to the taste, remind-

ing one of a good-sized gooseberry. Of *Cereus speciosissimus* and *Opuntia vulgaris* the fruit may be eaten as well. They also add greatly to the beauty of the plant when not in bloom. We have seen specimens of *Mamillaria appplanata* covered with over one hundred brilliant coral fruits, lasting for months. In *Echinocactus texensis* the large red seed pods are also much admired. *E. wislizenii* has fruit of a lemon color, which is also very pleasing. The spines generally form the beauty of the plant. An engraving cannot convey their beauty or diversified colors. When held to the light many of them show all the colors of the rainbow. Some have broad flat spines regularly ribbed, some straight, others curved, then again some are as sharp as needles, and more so. A few may be handled with impunity, such as *Mamillaria senilis*—as delicate as a ball of cotton, and *M. micromis* which looks like an embroidered button. Others are terrors to handle. Most of the Cactaceous plants are natives of North and South America, principally of Mexico. Only a limited number are found in South America. California, Nevada, Utah and Arizona produce some very fine species, while even in Montana we find some hardy varieties, and yet it is a curious fact that until recently it was impossible to buy from any one dealer in the United States more than fifty or a hundred varieties, while over a thousand varieties are known at the present time. To get these, some ten or fifteen foreign houses must be drawn upon, as it would require many thousands of miles and years of travel to collect even half that number in their native haunts. This fact naturally increases their value to some extent.—*Blanc's catalogue.*

Stibnite.

BY W. S. BEEKMAN, W. MEDFORD, MASS.

In accordance to a promise made in last issue, I was to give a description of the most beautiful metallic mineral in existence. This article will consist of that description, in a certain way. It will describe the mineral and give its name. As to portraying its beauties on paper, there is no power behind the pen adequate to fulfill such an undertaking. An illustration would convey its form better than words; but of its beauty—it is inconceivable, until seen.

With this fact in mind, many will ask, if about to give a description of the most beautiful of metallic specimens, why not give the article a heading with that specimen? It surely can have no reference to stibnite. Every tyro in collecting minerals will, or if not, should have, a good specimen of stibnite. It is a common and cheap mineral, very important in its relation to workable ores, and no collection is complete without its presence. But as to beauty, everyone on referring to the aspect of their specimen will wonder where the beauty comes in. It certainly has an attractive, cleanly appearance, generally pure, and free from matrix; but there are many others, as, for instance, the common iron pyrite, that far excells stibnite in attractiveness. The stibnite most widely circulated among collectors is generally from the New Brunswick locality; possessing a crystalline structure of a cold, steel-grey lustre; one glance at the average specimen being generally sufficient for a complete recognition of its external appearance. The specimens awakens

our interest only as we are capable of recalling its associations. This is the case with all specimens of a tame aspect.

You may be exhibiting your cabinet to X, Y and Z. The individual associations that each will feel in regard to your specimen is measured in the proportion of his knowledge or insight into the properties and character of the specimen under consideration. It is quite impossible for all to be affected alike by a specimen—sympathies find no likeness, unless we consider those outside the margin of minute details, where there is a greater chance of finding reciprocation of identical feelings. But here the sympathies with a specimen, and by sympathies is meant the intelligent interpretations, are governed according to the temperament as well as intellectual development of the observer. These three persons can have entirely foreign thoughts from each other awakened by this one specimen; X may recall something he has heard concerning the specimens connection; Y has perhaps read a note on its uses; while Z may associate it with some other member of the family to which it belongs, having no knowledge of what X is acquainted with, or Y concerning Z's subject.

As before stated, power to convey to your minds a likeness of the specimen in all its magnificence is utterly impossible. Clear conceptions of objects can never be acquired by interpreting descriptions; neither can a portrait be conveyed by words, accurately describing structure, unless having been revealed by optical representation as well as by mental energy.

You would never describe to a mechanic a new design which you wished

imitated by his art, if you desired the production to be exactly as you described; but you would assist description by something in like circumstances that is more powerful than words—a plan, a picture, or a model.

Your kind Editor would be most happy to give illustrations with all contributions that would be materially benefited thus. It is not the Editor's fault that they are not forth coming, but your own. If every subscriber would secure a subscription from at least one of their friends, this valuable magazine would be one hundred per cent. better off, and with such an advancement, what rapid strides toward even excelling whose journals which are now considered superiors. As you have thus far failed to do this, be content to know that the specimen is beautiful because we say so, and glean what you may from the inadequate description following.

To be concluded in our next issue.

QUERIES AND ANSWERS.

F. B., Rochester, N. Y.—Both drawings sent are of arrowheads; your imagination pictured the face.

L. N. A., St. Paul, Minn.—Specimens sent for identification are: 1, flint; 2 serpentine; 3, calcite; 4, quartz; 5, orthoclase.

W. N. S., Geneva, N. Y.—Egg sent are: Wilson and Wood Thrush, respectively.

C. D. O., Waco, Tex.—Can some of the readers tell me from this description the name of the bird here described. Head, throat and upper part of breast, brown; lower part of breast and underparts, white; back, brown; wings, brown and white; tail, brown with white margin; the white on the tail is very conspicuous when flying. The eye is red; bill, almost black; length, 8 inches; spread, 9½ inches.

H. C. O., Waterloo, N. Y.—The nest and eggs described were, as you thought, of the Golden-crowned Thrush.

In October issue, Mrs. L. W. asks for color of Barred Owl's eyes. Live specimens that we have had have the iris a blue black or smoky black; so dark as to seem nearly black. Taxidermists use dark hazel eyes for mounted specimens, but of late we have been using the smoky black color, which is much more natural. These were furnished by Mr. F. B. Webster, of Boston.

Dickey & Allen, Ackworth, N. H.

We have a few specimens on hand which we will identify as soon as possible.

We wish to thank our readers for the many excellent articles recently sent us. Come again.

EXCHANGES.

THIS column is open to all subscribers, who may insert exchanges free of charge. NO advertisements admitted to this column under any circumstances, and we shall reserve the right to insert no exchanges which are merely intended to secure cash purchasers.—Ed.

FRANK BOLL, 15 Montrose St., Rochester, N. Y.—Would like some sand from Sandwich Islands; will give any thing of equal value.

G. F. GUELFF, Brockport, N. Y.—I have a large quantity of choice minerals to exchange for birds' skins. Send list of skins for exchange.

W. H. PHILLIPS, 19 Bigelow ave., Cincinnati, O.—5 Cincinnati fossils, named, for 10 philatelic or natural history papers. Put name preceded by "From" on package and receive fossils next day.

W. S. BEEKMAN, W. Medford, Mass.—Books papers, magazines, curious, sea curiosities, minerals, fossils and a lot of useful things that will be given in exchange for books, minerals, fossils, fountain pen, etc.

ANSEL HILT. Warren, Maine.—A specimen of limestone for every mineral, fossil or petrifaction.

J. G. WAINWRIGHT. Wankegan, Ills. Fine rare specimens of coprolite, cabinet size, in exchange for a dime dated before 1875.

H. T. UPSON. Parkersburg, W. Va.—Will give fine Indian spear heads and arrows for U. S. copper cents and V nickles.

PHILIP SEIBEL. 735 O'Farrell St., San Francisco, Cal.—Starfish, sea urchins, serpentine and green or black slag to exchange for minerals or fossils.

ERNEST GAMBLE. Tecumseh, Mich.—Will exchange a small collection of old U. S. copper cents for best offer of birds' eggs in sets.

C. D. OLDRIDGE. Waco, Tex.—Birds in the meat to exchange. I have a compound microscope and slides (cost \$6.00) to exchange for birds' eggs in sets with data.

A. B. ROBERTS. Weymouth, Ohio.—Many varieties of first-class birds' eggs to exchange for Indian relics, good minerals, curiosities, fossils, etc. Exchange lists.

H. C. OSTRANDER. Waterloo, N. Y.—Collection of stamps consisting of 450 mixed foreign, 275 common U. S. postage, and 20 U. S. revenue to exchange for best offer in minerals or marine curiosities.

MRS. W. S. HAMLAND. Carthage, N. Y.—Chinese primroses, freesia alba, allium neapolitanum, new lemon, bronze and mammoth oxalices and cinerarias, all choice winter-blooming plants; also a large variety of other plants and bulbs to exchange for stuffed birds and choice sea shells.

W. W. WESTGATE. Houston, Tex.—I want specimens of *Geandina vanuxemiensis* (Lea.), *G. truncata* (Gmel.), *G. parallela* (W. G. B.), *G. decussata* (Desh.), *G. bullata* (Gld.), and *G. texasianna* (Pfr.).

J. W. JACOBS. Waynesburg, Pa.—I have sets of Nos. 494, 278, 387, 270, 12, 13, 375, 278, 22, 516, 261, 154, 214, 139, 450, 25 varieties single eggs, arrowheads and tobacco tags to exchange for eggs in sets or single.

G. E. WELLS. Ames, N. Y.—Specimens from Howe's cave, calcite, agates, cale spar, petrified woods, native woods, Indian pottery and pieces of axes, and many other things to exchange for fine minerals not in my collection, Indian relics, curiosities, etc. Correspondence desired with advanced collectors, also foreign, western and southern collectors.

J. H. MERRILL. Wenham, Mass.—Vol. II *American Naturalist* complete, with index; a lot of story and natural history papers and magazines; two books on poultry raising, U. S. and foreign stamps, and other article for a printing press, Indian relics, minerals and curiosities. Write what you have to exchange.

C. S. MASON. 13 So. College, Easton, Pa.—Asbestos, calcite, calamin, emery, elba ore, franklinite, flint, geodes (iron), goethite, hydrozincite, iron ore, kaolin, lithographic stone, limonite, grenochite, mica, pyrite, quartz, red granite, steatite, talc, willimite, zinc blende, zincite, zincon in steatite in exchange for quartz geodes, chalcedony, agates, copper and lead ores, curious forms of pyrite and calcite, minerals of all kinds, arrowheads and Monnd-Builders' relics.

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ALVAH DAVISON, Helmetta, N. J.

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This article will be worth more than the price asked for the paper.

SUBSCRIBE AT ONCE!!

~~WILL H. PLANK,~~

Editor and Publisher.

WYANDOTTE, KANS.

WONDERS.

In order to increase the circulation of the Milwaukee Naturalist, we make the following offer: Everybody sending us twenty-five cents will receive the Milwaukee Naturalist one year, and any one of the following specimens (your choice) free:—Alligator tooth, Chinese nut, Alm-tree bark, Arrow-head, Chinese chop-sticks, Pampas plumes, Sand crab, Sea urchin, Cactus wood, Chinese coin (very old), 1 doz. Shell beads. ~~—~~ The above are first-class specimens in every respect. E. SENN, Publisher, 253 12th Street. Milwaukee, Wis.

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GOLD

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